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# **Northeastern College**

January 1921

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## **CATALOG** of the **SCHOOL OF ENGINEERING**

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**1921-1922**

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**NORTHEASTERN COLLEGE**

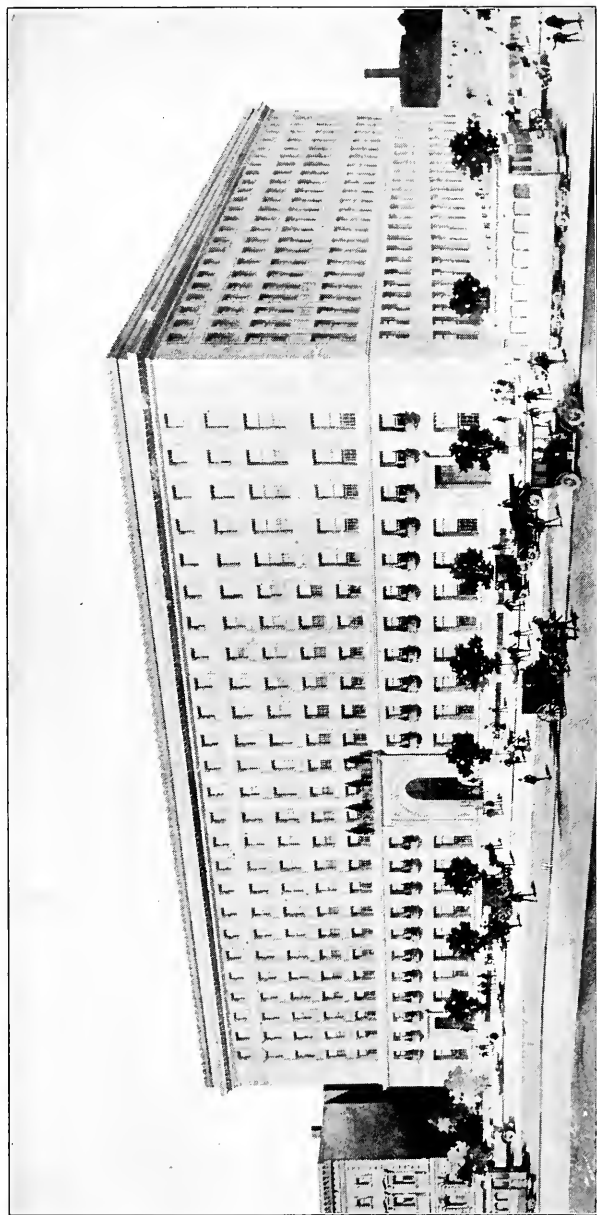
**Boston Young Men's Christian  
Association**

**Number 316 Huntington Ave., Boston, Massachusetts**

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THE ASSOCIATION BUILDING  
HOME OF NORTHEASTERN COLLEGE

# Northeastern College

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## CATALOG of the School of Engineering



1921-1922

Co-operative Plan

NORTHEASTERN COLLEGE

Boston Young Men's Christian Association

# YEARLY CALENDAR

## 1921

JANUARY						
S	M	T	W	T	F	S
..	..	..	..	..	1	
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9	10	11	12	13	14	15
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FEBRUARY						
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MARCH						
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APRIL						
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MAY						
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JUNE						
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JULY						
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AUGUST						
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SEPTEMBER						
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OCTOBER						
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NOVEMBER						
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DECEMBER						
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## 1922

JANUARY						
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FEBRUARY						
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MARCH						
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APRIL						
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MAY						
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JUNE						
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JULY						
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AUGUST						
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SEPTEMBER						
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OCTOBER						
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NOVEMBER						
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12	13	14	15	16	17	18
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26	27	28	29	30	..	..
..	..	..	..	..	..	..

DECEMBER						
S	M	T	W	T	F	S
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10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

School Periods for Division A indicated by type thus: 1 2 3.

School Periods for Division B indicated by type thus: 1 2 3.

Periods when School is not in session indicated by type thus: 1 2 3.

## CALENDAR 1921-1922

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- January 1, Saturday  
New Year's Day (School exercises omitted)
- January 31, Monday  
Third Period (Spring Term) begins for Division A
- February 21, Monday  
School exercises omitted
- February 22, Tuesday  
Washington's Birthday (School exercises omitted)
- March 7, Monday  
Third Period (Spring Term) begins for Division B
- April 11, Monday  
Fourth Period begins for Division A
- April 18, Monday  
School exercises omitted
- April 19, Tuesday  
Patriot's Day (School exercises omitted)
- May 16, Monday  
Fourth Period begins for Division B
- May 28, Saturday  
School exercises omitted
- May 30, Monday  
Memorial Day (School exercises omitted)
- May 31, Tuesday  
School exercises omitted
- June 12, Sunday  
Baccalaureate Sermon
- June 15, Wednesday  
Annual Commencement
- June 16, Thursday  
First Entrance Examinations
- June 17, Friday  
Bunker Hill Day (School exercises omitted)
- June 18, Saturday  
School exercises omitted

# **Calendar, 1921-1922**

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## **General Notes**

Division B is at Engineering Practice while Division A is at school.  
Division A is at Engineering Practice while Division B is at school.  
Periods at school are shown by different kinds of type on Yearly Calendar.  
All Engineering practice Periods are of five weeks duration throughout the year.  
Students while at Engineering Practice have no holidays except those regularly allowed by the employing firm.

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## **Special Notes for 1921**

June 20-July 23 Division B at Engineering Practice.  
August 8-Sept. 10 Division A at Engineering Practice.  
July 11-August 6 Summer Vacation for Division A.  
July 25-August 20 Summer Vacation for Division B.  
July 25-August 6 Neither division at Engineering Practice or at school

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June 20, Monday  
Summer Term begins for Division A  
July 4, Monday  
Independence Day (School exercises omitted)  
August 22, Monday  
Summer Term begins for Division B  
September 5, Monday  
Labor Day (School exercises omitted)  
September 8, Thursday  
Second Entrance Examinations  
September 12, Monday  
First Period (Fall Term) begins for Division A  
October 12, Wednesday  
Columbus Day (School exercises omitted)  
October 17, Monday  
First Period (Fall Term) begins for Division B  
November 21, Monday  
Second Period begins for Division A

## Calendar, 1921-1922

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November 24, Thursday

Thanksgiving Day (School exercises omitted)

December 22-17 inc.

Christmas Recess

December 28, Wednesday

Second Period begins for Division B

January 2, Monday

Observance of New Year's Day (School exercises omitted)

January 30, Monday

Third Period (Spring Term) begins for Division A

February 22, Wednesday

Washington's Birthday (School exercises omitted)

March 6, Monday

Third Period (Spring Term) begins for Division B

April 6-7-8, Thursday, Friday, Saturday

School exercises omitted

April 10, Monday

Fourth Period begins for Division A

April 17-18, Monday, Tuesday

School exercises omitted

April 19, Wednesday

Patriot's Day (School exercises omitted)

May 15, Monday

Fourth Period begins for Division B

May 29, Monday

School exercises omitted

May 30, Tuesday

Memorial Day (School exercises omitted)

June 14, Wednesday

Annual Commencement

June 15, Thursday

First Entrance Examinations

June 17, Saturday

Bunker Hill Day (School exercises omitted)

# **Calendar, 1921-1922**

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## **General Notes**

(See page 4)

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## **Special Notes for 1922**

June 19-July 22 Division B at Engineering Practice.  
August 7-September 9 Division A at Engineering Practice.  
July 10-August 5 Summer Vacation for Division A.  
July 24-August 19 Summer Vacation for Division B.  
July 24-August 5 Neither division at Engineering Practice or at school.

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June 19, Monday

Summer Term begins for Division A

July 4, Tuesday

Independence Day (School exercises omitted)

August 21, Monday

Summer Term begins for Division B

September 4, Monday

Labor Day (School exercises omitted)

September 7, Thursday

Second Entrance Examinations

September 11, Monday

First Period (Fall Term) begins for Division A

October 12, Thursday

Columbus Day (School exercises omitted)

October 16, Monday

First Period (Fall Term) begins for Division B

November 20, Monday

Second Period begins for Division A

November 30, Thursday

Thanksgiving Day (School exercises omitted)

December 25, Monday

Christmas Day (School exercises omitted)

December 26, Tuesday

Second Term begins for Division B

# Northeastern College

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## The Trustees

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1ST VICE-PRESIDENT

ALBERT HARMON CURTIS

2ND VICE-PRESIDENT

SABIN POND SANGER

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WILMAN EDWARD ADAMS

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GALEN DAVID LIGHT

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STANWOOD GRAY WELLINGTON

FRANK PALMER SPEARE

# Northeastern College

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## OFFICERS OF THE COLLEGE

FRANK PALMER SPEARE, M.H., *President*

GALEN DAVID LIGHT, A.B., *Secretary*

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## THE EXECUTIVE COUNCIL

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Dean of the School of Engineering and the Evening Polytechnic School  
Regional Director

DANA SCOTT SYLVESTER, L.L.B., B.C.S.

Dean of the School of Commerce and Finance

EVERETT AVERY CHURCHILL, A.B.

Dean of the School of Law

CARL DAVID SMITH, B.H.

Regional Director

IRA ARTHUR FLINNER, A.B., A.M.

Superintendent of Secondary Schools

# Northeastern College

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## FACULTY OF THE SCHOOL

CARL STEPHENS ELL, A.B., M.S., Dean 52 Clement Ave., West Roxbury  
*Professor of Civil Engineering*

PHILIP CURTIS NASH, A.B., M.C.E. 5 Mansfield St., Allston  
*Director of Engineering Practice and Professor of Civil Engineering*  
*In charge, Department of Civil Engineering*

JOHN BUTLER PUGSLEY, A.B., Registrar 23 Hardy Ave., Watertown  
*Assistant Professor of Mathematics*

GEORGE FRANCIS ASHLEY 163 Summer St., Somerville  
*Professor of Drawing*  
*In charge, Department of Drawing*

JOSEPH ARTHUR COOLIDGE, S.B. 20 Martin St., Cambridge  
*Professor of Physics*  
*In charge, Department of Physics*

PEARL WHITEFIELD DURKEE, B.S. 505 Huntington Ave., Boston  
*Professor of Electrical Measurements*

WILLIAM LINCOLN SMITH, S.B. 4 Academy Lane, Concord  
*Professor of Electrical Engineering*  
*In charge, Department of Electrical Engineering*

GEORGE WRIGHT SWETT, S.B. 11 Henry Ave., Melrose Highlands  
*Professor of Mechanical Engineering*  
*In charge, Department of Mechanical Engineering*

ROBERT SEATON WILLIAMS, Ph.D. 156 Magazine St., Cambridge  
*Professor of Analytical Chemistry*  
*In charge, Department of Chemical Engineering*

HENRY BISSELL ALVORD, S.B. 32 Hollis St., South Weymouth  
*Assistant Professor of Civil Engineering*

PERCY FRANCIS BENEDICT, S.B. 491 Belmont St., Belmont  
*Assistant Professor of Civil Engineering*

GEORGE BLODGETT GEE, C.E. 17 Pine St., Belmont  
*Assistant Professor of Drawing*

# Northeastern College

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## FACULTY OF THE SCHOOL (Continued)

JOSEPH SPEAR, A.B. <i>Assistant Professor of Mathematics</i> <i>In charge, Department of Mathematics</i>	819 Salem St., Malden
CHESTER PACKARD BAKER <i>Instructor in Chemistry</i>	53 Wendell Ave., Brockton
JESSE JENNINGS EAMES, S.B. <i>Instructor in Mechanical Engineering</i>	Swampscott, Mass.
ALFRED JOHN FERRETTI, S.B. <i>Instructor in Mechanical Engineering</i>	92 Church St., Lynn
LEON FREDERICK GIRARD <i>Instructor in Physics</i>	206 Massachusetts Ave., Boston
HAROLD WESLEY MELVIN, B.A. <i>Instructor in English</i> <i>In charge, Department of English</i>	21 Austin St., Milton
LEON WOODMAN PARSONS, Ph.D. <i>Instructor in Physical Chemistry</i>	5 Braemore Road, Brookline
ROLAND GUYER PORTER <i>Instructor in Electrical Engineering</i>	39 Baker Ave., Beverly
ARTHUR HITCHCOCK RADASCH, S.B. <i>Instructor in Chemical Engineering</i>	1200 Massachusetts Ave., Cambridge
JOHN STANLEY RAFFETY, B.A. <i>Instructor in Civil Engineering</i>	73 Mountfort St., Boston
JOHN JAMES SINNETT <i>Instructor in Physical Training</i>	24 Bardwell St., Jamaica Plain
ARTHUR EARLE SMITHIES <i>Instructor in Physics</i>	Room 620, Boston Y. M. C. A.
FREDERICK A. STEARNS, S.B. <i>Instructor in Mechanical Engineering</i>	208 Grove St., Melrose
SAMUEL ABBOTT SMITH STRAHAN <i>Instructor in Chemical Engineering</i>	26 Hemenway St., Boston

# Northeastern College

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## FACULTY OF THE SCHOOL (Continued)

### ASSISTANTS

CHARLES REID ALLAN <i>Assistant in Physics</i>	37 Hawthorne Road, Pittsfield
ABRAHAM ALBERT BECKER <i>Assistant in Chemistry</i>	298 Western Ave., Cambridge
THEODORE BENJAMIN BLISS <i>Assistant in Chemistry</i>	75 Prince St., Jamaica Plain
ALFRED BROWN <i>Assistant in Chemistry</i>	18 Green St., Everett
RALPH EUGENE BROWN <i>Assistant in Physics</i>	475 Union St., Rockland
EDWARD S. PARSONS <i>Assistant in Civil Engineering</i>	705 Washington St., Gloucester
CHARLES CLIFTON RUSSELL, JR. <i>Assistant in Electrical Engineering</i>	21 Eliot St., Quincy
JESSE ARNOLD SHAW <i>Assistant in Chemistry</i>	14 Page St., Danvers
BENJAMIN LINCOLN SMITH <i>Assistant in Electrical Engineering</i>	4 Academy Lane, Concord
ROGER ELIOT SPEAR <i>Assistant in Civil Engineering</i>	90 Gainsborough St., Boston

# Northeastern College

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## SPECIAL LECTURERS

ASA S. ALLEN

Member of the Law Firm of Curtin, Poole & Allen  
"Law and Engineering"

MATTHEW C. BRUSH

President, American National Ship Building Corp.  
"The Human Equation in Business"

JOE MITCHELL CHAPPLE

Editor of the "National Magazine"  
"The Magic of Memories"

HIS EXCELLENCY CHANNING H. COX

Governor of the Commonwealth of Massachusetts  
"Civic Responsibilities"

BREWER EDDY

Assoc. Secretary, American Board of Commissioners for Foreign  
Missions  
"America's International Duty"

CHARLES W. ELIOT

President Emeritus of Harvard University  
"A Useful and Enjoyable Life"

EDWIN H. HUGHES

Bishop, Methodist Episcopal Church, Boston Area  
"Money and Education"

PAYSON SMITH

State Commissioner of Education  
"Productive Education"

FRANK P. SPEARE

President of Northeastern College  
"College Men in Industry"

GEORGE F. SWAIN

Professor of Civil Engineering, Harvard University  
"The Dangers of Idealism"

CURTIS H. WATERMAN

Lawyer  
"What is a Profiteer?"

DeWITT G. WILCOX

Surgeon  
"A Young Man's Problems"

## *SCHOOL OF ENGINEERING*

### **GENERAL INFORMATION**

#### **Historical**

In September, 1909, the Department of Education of the Boston Young Men's Christian Association began to offer co-operative engineering courses in connection with the Evening Polytechnic School. At that time, the co-operative course students were employed by engineering firms on the one week period plan, a student working one week while his alternate was going to school, and at the close of the week exchanging places so that the student who had been to school went to work. Conditions were such that the students attended both day and evening classes. Two years later it was decided to establish an engineering school, to do work of college grade, based entirely on the part-time, or co-operative plan. Thus, in 1909, was started what is now the School of Engineering of Northeastern College.

In the twelve years that have elapsed since the inception of the idea, the school, which was started with no special educational requirements for entering students, and which had but little equipment and a registration of only eight pupils, has grown to be a recognized factor in the community, with rigid requirements of scholarship and character for entering students, thousands of dollars' worth of equipment, a highly trained and able faculty, and an enrollment of five hundred and seventy-five students. It is enabling the young man of moderate financial ability to get a high-grade engineering training and at the same time not only defray his own expenses, but also become familiar with the actual practice of his profession.

In March, 1920, the school received the degree granting privilege through the Massachusetts Legislature.

#### **Object of the School**

Technical school instruction, depending on class-room work and laboratories, must always lack some of the vital characteristics of an actual manufacturing plant. One is carried on for educational purposes, while the other is operated for dividends. It is this latter fact that gives the co-operative school idea one great advantage over the usual educational plan. In-

## SCHOOL OF ENGINEERING

stead of training the student for several years for a line of work to which he may later find himself entirely unfitted, the School at once puts the boy to work in a commercial plant. There he learns life in its vital issues, as well as the problem of getting along with men; thus early finding out whether he has made a wise or unwise choice of his life work. This training shows him the use and value of his school work, and finally gives him an unusual opportunity to acquire from actual experience that rare characteristic, *executive ability*, without which his life probably would be spent on the lower levels of industry.

The fundamental aim of this School is to give young men sound training in both the theoretical and practical principles upon which professional practice is based. Thus they are enabled to advance farther and more rapidly in their chosen work than they could expect to do without further education than that of a high-school course. The training is not in any sense that of a trade school, but is that of a regular engineering school of high standards.

There are four branches of engineering work offered: civil, mechanical, electrical, and chemical. The end sought is to give to students who have already had a high-school preparation, or its equivalent, a good training in the fundamental sciences of mathematics, chemistry and physics, and in the important applications of the principles of these sciences to the several branches of engineering. Much stress is laid on the development of the ability to apply the acquired knowledge to new engineering problems, and an effort is made to be thorough without leading the student through a maze of mere mental gymnastics.

The courses differ from those of many schools, in that a student is not permitted a wide range of subjects from which to choose. It has been found that better results are obtained by prescribing the principal studies which the student is to pursue.

### Plan of Operation of the School

To illustrate the plan of operation of the School, take the case of two men, "A" and "B," who desire to take our Mechanical Engineering Course. "A" is assigned to one of the plants

## RELATION OF SCHOOL TO HIGH SCHOOL

of a firm that is co-operating with us. Here he is put to work, and spends five weeks working for the firm. Then "B," his alternate, who has spent the first five weeks in the School, takes "A's" place with the firm, and "A" puts in the next five weeks at school. Thus the work goes on, the two men exchanging places at the beginning of each five week period.

### Relation of School to High Schools

This School is peculiarly adapted to the high school graduate with limited financial resources who still has the ambition and ability to get ahead if given the opportunity.

This year the school has a student body made up of graduates of the following schools:

Abington High School	Burlington (Vt.) High School
Alton (N. H.) High School	Cambridge Latin High School
Amesbury High School	Central High School
Annapolis Royal Academy (Granville Ferry, Nova Scotia)	(San Juan, Porto Rico)
Anson (Me.) Academy	Chelmsford High School
Arlington High School	Chelsea High School
Ashland High School	Chester High School
Athol High School	Chicopee High School
Attleboro High School	Clinton High School
Avon High School	Cohasset High School
Baddeck High School	High School of Commerce
(Sidney, Nova Scotia)	Concord (Mass.) High School
Bartlett High School (Webster)	Concord (N. H.) High School
Beezazian School (Constantinople, Turkey)	Conway High School
Bellows Falls High School	Cony High School
Belmont High School	(Augusta, Me.)
Berkeley Preparatory School	Cranston (R. I.) High School
Berlin (N. H.) High School	Dalton High School
Beverly High School	Danvers High School
School	Dean Academy
Boothbay Harbor (Me.) High	Deep River (Conn.) High School
Boston College High School	Deering (Me.) High School
Bourne High School	Dexter (Me.) High School
Braintree High School	Dorchester High School
Brewster Free Academy	Dummer Academy
(Wolfeboro, N. H.)	Duxbury High School
Bridgeport (Conn.) High School	East Boston High School
Bridgewater High School	East Bridgewater High School
Brighton High School	Eastport (Me.) High School
Bristol (Conn.) High School	Enfield High School
Brockton High School	(Thompsonville, Conn.)
Brookfield High School	English High School
Brookline High School	Essex County Agricultural School
	Essex (Mass.) High School
	Essex (Vt.) High School

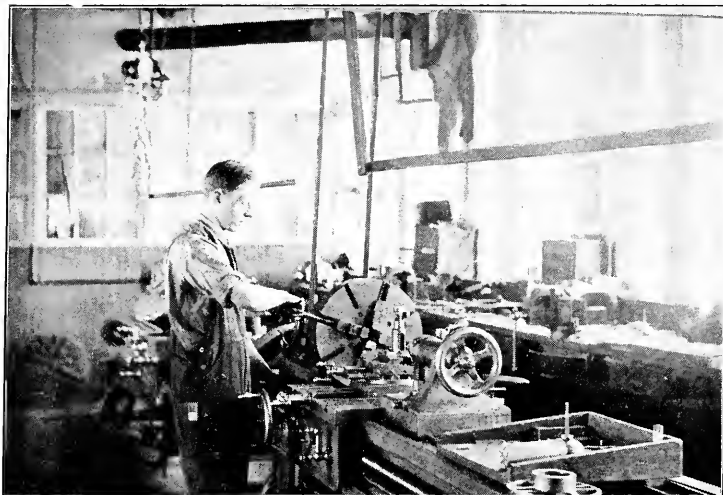
## SCHOOL OF ENGINEERING

Everett High School	Mansfield High School
Exeter (N. H.) High School	Marblehead High School
Fair Haven (Vt.) High School	Marlboro High School
Fairhaven (Mass.) High School	Marshfield High School
Fall River High School	Maynard High School
Fitchburg High School	Mechanic Arts High School
Foxboro High School	Medford High School
Framingham High School	Melrose High School
Franklin High School	Middlebury (Vt.) High School
Freeport (Me.) High School	Milbridge (Me.) High School
Fryeburg (Me.) Academy	Milford High School
Gardner High School	Milton High School
Georgetown High School	Montpelier (Vt.) Seminary
Gilman (Me.) High School	Montpelier (Vt.) High School
Gloucester High School	Mt. Hermon School
Gould's Academy (Bethel, Me.)	Nantucket High School
Groveland High School	Nashua (N. H.) High School
Hallowell (Me.) High School	Natick High School
Hardwick (Vt.) Academy	New Britain (Conn.) High School
Hartford (Conn.) High School	Newburyport High School
Haverhill Hill School	Newton High School
Hingham High School	North Attleboro High School
Holbrook High School	Northeastern Secondary School
Holliston High School	Norton High School
Holyoke High School	Norwell High School
Hopedale High School	Norwood High School
Horblitt Preparatory School	Pawtucket High School
Huntington School	Peabody High School
Hyde Park High School	Phillips Exeter Academy (N. H.)
Jonesport (Me.) High School	Pittsfield High School
Keene (N. H.) High School	Plainfield (Conn.) High School
Kennebunk (Me.) High School	Plymouth High School
Kimball High School	Portland (Me.) High School
Kingston High School	Pratt (Conn.) High School
South Kingston (R. I.) High School	Proctor (Vt.) High School
Lancaster High School	Providence Technical High School
Lausitz High School (Germany)	Provincetown High School
Lee High School	Putnam (Conn.) High School
Leicester High School	Quincy High School
Lewis (Conn.) High School	Reading High School
Lewis & Clark High School	Revere High School
(Washington)	Richards (N. H.) High School
Lexington High School	Rindge Technical High School
Livermore Falls (Me.) High School	Rochester (N. H.) High School
Los Angeles (Cal.) High School	Rochester (N. Y.) High School
Lowell High School	Rockland High School
Lyman Hall (Conn.) High School	Sacred Heart High School (R. I.)
Lynn Classical High School	Salem High School
Lynn English High School	Sanderson Academy
Madison (Me.) High School	Schuylerville (N. Y.) High School
Maine Central Institute (Me.)	Scituate High School
Malden High School	Sharon High School
Manchester High School	Shrewsbury High School
	Simsbury (Conn.) High School



THE LOBBY

# Mechanical Engineering Students



Machine Shop Work  
Dennison Manufacturing Company—Framingham



Class in Drafting  
Drafting Rooms

## RELATION OF SCHOOL TO HIGH SCHOOL

Skowhegan (Me.) High School	Watertown High School
Solon (Me.) High School	Wellesley High School
Somerville High School	West Roxbury High School
Springfield Technical High	West Springfield High School
Stephens (Me.) High School	Westbrook (Me.) Seminary
Stevens (N. H.) High School	Westinghouse High School
Stoneham High School	Weymouth High School
Stonington (Conn.) High School	Williamstown High School
Stoughton High School	Williston Seminary
Stowe High School	Wilmington High School
Sudbury High School	Windham (Conn.) High School
Swampscott High School	Winthrop High School
Taunton High School	Woburn High School
Templeton High School	Woodstock (Conn.) Academy
Thayer Academy	Woodstock (Vt.) High School
Thompson High School (Conn.)	Woodsville (N. H.) High School
Tilton (N. H.) Seminary	Worcester Classical High
Traip (Me.) Academy	Worcester Commercial High
Vinalhaven (Me.) High School	Worcester South High School
Wakefield High School	Worcester Trade School
Waltham High School	

## *SCHOOL OF ENGINEERING*

### **ENGINEERING EQUIPMENT**

The School is housed in the buildings of the Association, and in addition occupies the entire third floor of the Gainsborough Building, directly opposite.

The equipment available for the use of the School includes :

36 Class Rooms	2 Libraries
5 Drawing Rooms	3 Social Rooms
3 Chemical Laboratories	3 Game Rooms
1 Electrical Engineering Laboratory	3 Gymnasiums
1 Electrical Measurements Laboratory	1 Swimming Pool
1 Mechanical Engineering Laboratory	2 Large Halls
2 Physics Laboratories	8 Offices and Equipment
Civil Engineering Equipment	

### **Mechanical Laboratories**

The steam power plant is completely equipped with meters, scales, indicators, Orsat apparatus for flue gas analysis, and all other equipment necessary for making complete power plant tests. The plant consists of four horizontal-return tubular boilers, two of which are equipped for burning fuel oil and two for burning coal ; and four three wire generators, of which, three are driven by Ridgway reciprocating steam engines of various sizes, and the other is direct connected to a Westinghouse-Parsons turbine. This places at the disposal of our classes a perfectly equipped, up-to-date, engineering laboratory, and gives them the means of carrying on boiler tests, determining the efficiencies of various fuels and oils, taking indicator diagrams, determining the efficiency of modern reciprocating engines and turbines when direct connected to generators, as well as renders them familiar with all the various auxiliary appliances of such a plant, as separators, pumps, air compressors.

The students also have the use of the equipment of our Automobile School, thus having opportunity to study the most advanced ideas in gasoline engine practice.

### **Field Instruments of Civil Engineering**

For work in the field, the Civil Engineering Department possesses various surveying instruments, representing the principal makes and types in general use. The equipment includes

## *EQUIPMENT OF THE SCHOOL*

two Keuffel & Esser transits, two Buff & Buff transits, two Berger levels, two other levels, and three plane table outfits. There are Locke hand levels, flag poles, leveling rods, stadia rods, engineers' and surveyors' chains, steel and cloth tapes, and all the miscellaneous equipment necessary to outfit the parties that the instruments will accommodate. The transits are equipped with neutral glasses and reflectors for astronomical observations. For higher surveying there is an aneroid barometer for barometric leveling, a sextant for hydrographic surveying, and a Gurley Electric Current meter for hydraulic measurements.

The extent of the equipment and scope of the field work itself are designed to train the student's judgment as to the relative merits of the various types of field instruments.

### **Design and Drafting Rooms**

The School possesses large, light, and well-equipped drawing rooms for the carrying on of the designing and drafting which form so important a part of engineering work. These rooms are supplied with lockers containing the drawing supplies, and files containing blue prints and photographs of machines and structures that represent the best practice.

### **Electrical Measurements Laboratory**

The laboratory was entirely rebuilt during the summer of 1920. It is equipped with apparatus fundamentally planned for teaching the principles of measurement, rather than for the precise determination of quantitative results. Nevertheless it is necessary for the proper performance of work in the other laboratory courses that a certain amount of careful quantitative work should be done, and the equipment is being steadily increased and developed with both ends held in view.

A partial list of the apparatus available for instruction is the following. Under the first head, resistance by Ohm's law, substitution and direct reflection, voltmeter methods for high resistance, insulation resistance, specific resistance, slide wire bridge, electrostatic capacity, inductance, Poggendorf's method of E. M. F. comparison. Under the second head, a Laboratory

## *SCHOOL OF ENGINEERING*

standard Wheatstone bridge, a Kelvin low resistance bridge, a Leeds Northrup potentiometer with two standard Weston cells, volt box and steady source of high voltage for voltmeter calibration, a commutator and leads for use with the Carey-Foster method, and a chemical balance.

The instrument room is supplied with 18 high grade G. E. and Weston ammeters and voltmeters of various sizes for D. C. work, together with numerous similar instruments of cheaper quality for lower class work.

For A. C. testing, there are 27 voltmeters and ammeters of various sizes arranged in groups of three for polyphase work, and 8 single or three phase wattmeters.

There is also a considerable amount of auxiliary apparatus such as frequency indicators, synchrosopes, and power factor meters.

### **Electrical Engineering Laboratory**

The Laboratory was entirely remodeled during the summer of 1920. It is equipped with numerous machines of different types, the size and voltage ratings being selected to reduce as much as possible the risk from large voltage and power apparatus, while at the same time making available to the student commercial apparatus such that the various quantities it is desired to measure will be of reasonable dimensions.

Moderate-sized machines are used principally for this reason but also because the students in their Engineering Practice come into contact with the large-sized and varied machinery of modern power houses and electrical plants generally.

Among the machines of this department are a pair of matched Holtzer-Cabot 5 kv-a synchronous converters, specially planned to operate as 3 phase generators, motors or double current generators. They are driven independently by 10 HP 220 volt General Electric interpole motors, and may also be mechanically coupled for certain work.

There is also a pair of matched and specially designed direct current generators of 6 kilowatt rating at 220 volts, which may be operated either shunt or compound, driven by a 15 kilowatt interpole Sprague motor with double extended shaft. These machines are particularly intended for work on charac-

## *EQUIPMENT OF THE SCHOOL*

teristics and parallel operation, but may also be coupled so as to be available in the various "pumping back" methods of testing.

Alternating current is supplied by a three phase General Electric 15 kv-a alternator, giving practically a pure sine wave, driven by a 20 kw Westinghouse motor; there is also a 7.5 kv-a General Electric alternator driven from a 15 HP Sprague motor, fitted with taps from each armature coil, a 5 kv-a Holtzer-Cabot machine with two spare rotors making it available either as a generator, synchronous motor, squirrel cage or phase wound induction motor; and a dozen or so more motors and generators of various sizes and types.

There are two sets of G. E. type H transformers, three to the set, of 3 kv-a rating with primary voltage of 550 and secondary of 220-110, which may be used for transmission experiments as well as ordinary testing, and a very considerable assortment of variable ratio transformers, reactances, condensers, and similar control and testing apparatus aside from the very complete line of instruments belonging to the Electrical Measurements Laboratory.

### **Physics Laboratories**

The Physics department has been completely equipped with all necessary apparatus for the experimental work that is required of the students, as well as that required for lecture demonstration. There are two large laboratories together with a lecture room devoted to Physics. The apparatus and equipment includes verniers, levels, a vacuum pump, planimeters, spherometers, calorimeters, thermometers, a pyrometer, a sonometer, a spectroscope, a spectrometer, balances, standard gram weight, lecture table galvanometer, optical disk with all accessories, lenses, photometer, an air thermometer, a full set of Weather Bureau apparatus, including a barograph, thermograph, hygrometer, barometer, maximum and minimum thermometers, etc. These give a wide range to the experimental work that can be done.

### **Chemical Laboratories**

The School has three laboratories completely equipped in all respects for carrying on all lines of chemical work, from

## *SCHOOL OF ENGINEERING*

that of a high school to that of most advanced college grade. They have accommodations for over one hundred and fifty students, and are suitably furnished with all the necessary appliances for chemical work. Some of these are: hoods, drying closets, a still, steam and hot water baths, electrolytic circuits, vacuum and pressure apparatus, balances, combustion furnaces, and complete sets of apparatus for the sampling and analysis of flue gases and fuels. There are also testing machines for oils, viscosimeters, and different sorts of flash point apparatus. A chemical museum is connected with this department where are kept specimens for purposes of illustration.

### **Libraries**

The School shares the privileges of the steadily growing Libraries in the Main Building, to which have been added more than a \$1000 worth of engineering texts purchased for the School. In addition to this, it subscribes to current periodicals on engineering and scientific subjects for the exclusive use of students. All members of the School are entitled to take books from the Boston Public Library, and this offers a very unusual opportunity to our non-resident students.

### **Department of Physical Training**

Northeastern is one of the few colleges having facilities for all-round physical training. The gymnasium with its 12-laps running track, three basketball courts, wrestling, boxing, fencing and special exercise rooms, handball courts and bowling alleys, is one of the most complete in New England. The natatorium is one of the best in the country. It is in a separate building, having a glass roof, admitting abundant sunlight and has a continuous supply of filtered salt water. The tank is 75 feet long and 25 feet wide. Adjoining the building is a large field equipped for athletics. Here are four tennis courts, outdoor gymnasium, basketball court, jumping pits and a track with a 100-yd. straightaway; baseball and football fields. Interclass contests are arranged in basketball, baseball, tennis, indoor and outdoor athletics, and swimming. Intercollegiate games and meets are arranged with the leading colleges in the east.

## *ENGINEERING PRACTICE*

### **ENGINEERING PRACTICE**

#### **Correlation of Practical and Theoretical Work**

The employers who co-operate with us agree, where practicable, to employ the students in all the different departments of their establishments during their periods of engineering practice. This training is just as complete as the school work, and is just as thorough. Where possible, the course of the student is from the handling of the raw material to the shipment of the finished product. This practical training includes the use of the machines, as well as the executive duties of the plant, so that at the end of his course the graduate may not only know how to do things, but also why they are done in certain ways. Detailed reports are made by each student for each of his five week working periods. The subjects for these reports are chosen by the student and may be anything of importance in connection with his job. These reports are criticized and discussed when the student returns to school. Accurate records and grades are kept of the engineering practice of each student, and it is not possible to secure a degree unless this part of the course is completed successfully.

#### **Number of Positions Available**

The number of positions at our disposal in any one branch of engineering is necessarily limited. Thus far we have secured desirable positions for our students as the growth of the School has demanded. Nevertheless, to be at all sure of work in his chosen branch of engineering, an applicant should file his application early.

The applicants who apply for admission to the School too late to be assigned to practical work, may attend the School every period, or every alternate period, as they may wish, and will be assigned to practical work as soon as an opening occurs.

Sometimes, students may secure their own positions with firms, in which case an alternate can usually be furnished by the School, if desired. Such individual arrangements are entirely acceptable to the School, and may be made by any applicant, subject to the approval of the Director of Engineering Practice.

## SCHOOL OF ENGINEERING

### Attitude of Co-operating Firms

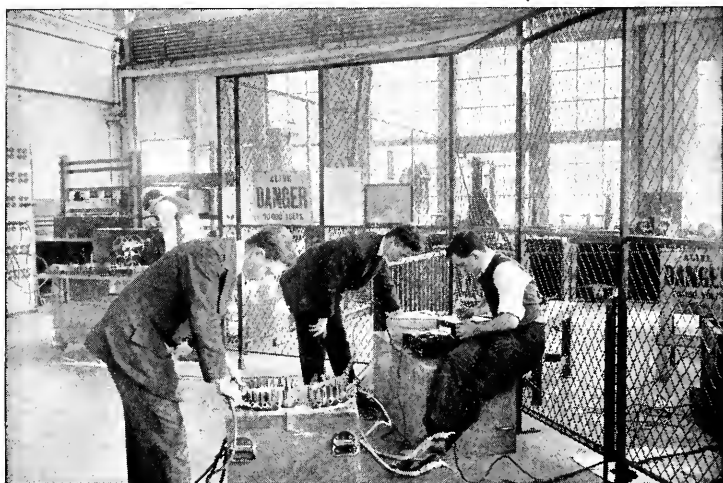
The favorable attitude of the co-operating concerns toward our plan is shown by their retention of the same students from year to year, even after graduation, and also in the fact that whenever vacancies occur which can be filled by our men, the firms often apply for additional students to fill them. The men under whose supervision the students have been in their outside work are practically unanimous in approval of our plan, and speak highly of the enthusiasm, earnestness and intelligence the students have shown in the performance of their duties.

### Working Relations

When a student is first assigned to a firm, the School gives him general information in regard to the work and a letter of introduction. At the first interview the student is expected to familiarize himself with the kind of work on which he is to be engaged while with the firm, and the conditions under which he is to work. It is expected that no student will accept employment through the school unless he can and will continue in School and with the firm in question throughout the year in accordance with the general plans of Engineering Practice. During the periods of Engineering Practice the students report for work at the regular working hours of the firm, no special privileges being granted. Students are not permitted to discontinue Engineering Practice except under unusual conditions and only by previous arrangements with the School. *In all cases of absences from Engineering Practice, whether unavoidable or not, the student or a member of his family is required to notify the employing firm by telephone immediately at or before the time of the occurrence of the absence.* This matter of notifying the employing firm immediately is very important. Failure to do so is sufficient cause for dismissal.

The school places the student at work with the employing firm and is responsible for his presence and conduct at work as well as the quality and scope of his work. All difficulties arising in regard to students who are in Engineering Practice are taken up with the School at the next following school period. *It is absolutely necessary that each student be prepared to ful-*

# Students Engaged in Engineering Practice

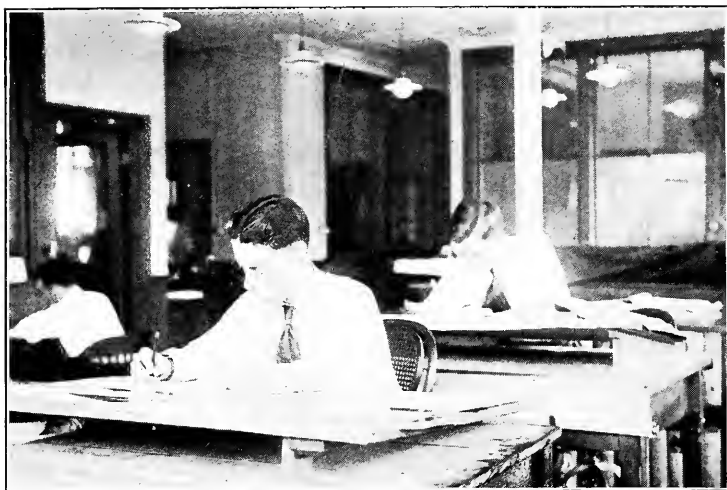


Making a High Tension Test  
Edison Electric Illuminating Company

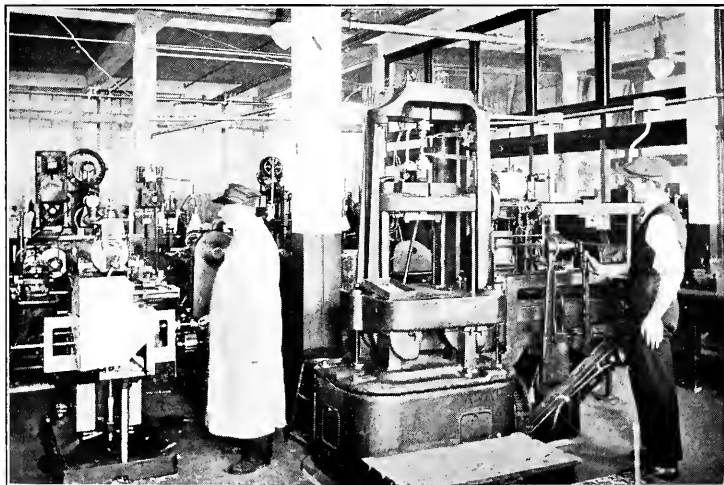


Drafting  
Designing Engineer's Office—B. & A. Railroad

# Students Engaged in Engineering Practice



Machine Designing  
Kinney Manufacturing Company—Boston



Making Tensile Tests on Steel  
General Electric Company—Lynn

## ENGINEERING PRACTICE

*fill his engineering practice obligations as faithfully during the summer months as at any other time*, and no student can ordinarily expect any longer vacation than the regular four weeks specified during the summer.

Students in the sophomore, junior and senior years are almost invariably placed with firms which give them experience directly in line with the course of study followed at school.

Freshmen, as a rule, are assigned to work not so technical in character, but designed to train the younger men in the fundamental qualities of cheerfulness, dependability, enthusiasm, and grit. These attributes are essential to the successful completion of the upper class work. They are emphasized at every opportunity during the student's college life in connection with his engineering practice, and the first year's training is designed especially to develop these habits. If a young man can form the habits of mental and physical alertness and reliability, he has laid a sure foundation for his success and happiness in after life. The detailed technical information and experience is added in the three upper years.

In general, all changes and transfers in Engineering Practice are made at the beginning of the school year in September.

### Earnings

The firms treat our students as they do their other employees in manner of payment, rates of pay, chances for promotions, etc. Each firm makes individual arrangements with the student, and the School does not attempt to supervise except for occasional consultations with the employers over general policies.

The rates of pay for students in the School are kept low so that the employer feels justified in devoting time to the instruction of the students and in transferring students from one department to another at approximately regular intervals.

By agreement with the co-operating firms the following minimum wages are paid to the students.

- \$10 per week for the first school year.
- 12 per week for the second school year.
- 14 per week for the third school year.
- 16 per week for the fourth school year.

## SCHOOL OF ENGINEERING

Ordinarily a student starts with each firm at the minimum wage and is promoted as his ability may warrant. In certain cases the students receive less than the minimum stated above, but this is usually made up to them in some other way.

No upper limit of wages is set. The average maximum is \$18 to \$20 even for men of exceptional ability, because the students are given the privilege of attending school on the co-operative plan and of being transferred from one department to another. The sum earned is more than enough to pay the tuition and the necessary expenses of schooling, but does not cover the cost of living.

### Schedules of Engineering Practice

Below are typical schedules of Engineering Practice that have been prepared for our students by some of the companies which are giving them employment:

#### **Boston & Maine Railroad Co.**

ONE YEAR	Erecting Dept.
ONE YEAR	Machine Dept.
ONE YEAR	Machine Dept.
ONE YEAR	Drafting Room

#### **Simplex Wire & Cable Co.**

ONE YEAR	Insulating Dept.
	Braiding Dept.
ONE YEAR	Cable Shop
	Twisting Dept.
ONE YEAR	Machine Shop Construction Gang
	Electrical Construction Gang
ONE YEAR	Testing Room

#### **The Dennison Manufacturing Co.**

ONE YEAR	Carpenter's Helper
	Pattern Maker's Helper and Case Making
	Mill-wright Work and Elevator, Fire Door Inspection
	Helper in Electrical Dept.
ONE YEAR	Machine Shop Stock Room
	Machine Shop
	Grinding Room
ONE YEAR	Power Plant Work
	Accident Prevention Work
	Filing Plans, Blue Prints, Tracing, Etc.
	Planning Dept. Work
ONE YEAR	Tracing and General Work
	Detailing and General Drafting

## ENGINEERING PRACTICE

### Crofoot Gear Works

ONE YEAR	Inspection Dept.
	Finishing Dept.
ONE YEAR	Hobbing Dept.
	Cutting Dept.
ONE YEAR	General Grinding Dept.
	Tool Making

### Simplex Electric Heating Co.

ONE YEAR	Machine Dept.
ONE YEAR	Grinding Dept.
	Stock Dept.
	Winding Dept.
	Enameling Dept.
	Assembling Dept.
ONE YEAR	Testing Dept. First Division
	Testing Dept. Second Division
ONE YEAR	Shipping Dept.
	Drafting Dept.
	General Shop Experience

### Boston & Albany Railroad Co.

ONE YEAR	Work in Field Party
ONE YEAR	Work in Drafting Room
ONE YEAR	Masonry Inspection
	General Railroad Work
	Railroad Accounting
ONE YEAR	Railroad Accounting
	Timekeeping and Unit Costs

### Condit Electrical Manufacturing Co.

ONE YEAR	Testing D. C. Apparatus
	Testing A. C. Apparatus
ONE YEAR	Switchboard
	Construction
	Installation
ONE YEAR	Blue Printing
	Drafting
ONE YEAR	Engineering
	Engineering Specifications

### Co-operating Firms

ABERTHAW CONSTRUCTION COMPANY (Civil)  
ACME APPARATUS COMPANY, Cambridge (Electrical)  
AMERICAN ACID COMPANY, Medford (Chemical)  
AMERICAN AGRICULTURAL CHEMICAL COMPANY (Chemical)  
AMERICAN GLUE COMPANY, Peabody (Electrical)  
AMERICAN RADIO & RESEARCH CORPORATION (Electrical)  
AMERICAN STEAM GAGE & VALVE COMPANY (Mechanical)  
APPLETON, THOMAS A., Civil Engineer, Salem (Civil)  
ARLINGTON FOUNDRY (Chemical and Mechanical)  
ARNOLD MACHINE SHOP, Rockland (Mechanical)

## SCHOOL OF ENGINEERING

ASPINWALL & LINCOLN, Civil Engineers (Civil)  
BARNES, ROWLAND H., Civil Engineer (Civil)  
BATES, C. J., & SONS, Chester, Conn. (Mechanical)  
BATES, WALTER C., Surveyor (Civil)  
BEACON OIL COMPANY, Everett (Chemical)  
BETHLEHEM SHIPBUILDING CORPORATION (Civil, Mechanical, Electrical)  
BLANCHARD MACHINE COMPANY, Cambridge (Mechanical)  
BOSTON & ALBANY RAILROAD (Civil)  
BOSTON CONSOLIDATED GAS COMPANY (Chemical)  
BOSTON FUEL TESTING COMPANY (Chemical)  
BOSTON INDIA RUBBER COMPANY (Chemical)  
BOSTON & MAINE RAILROAD (Mechanical and Civil)  
BOSTON UNIVERSITY—LABORATORY (Chemical)  
BOSTON VARNISH COMPANY, East Everett (Chemical)  
BRANCH, ERNEST W., Civil Engineer, Quincy (Civil)  
BROADWAY IRON FOUNDRY, Cambridge (Mechanical)  
BUFF & BUFF MANUFACTURING COMPANY, Jamaica Plain (Civil)  
BURGESS, W. J., Quincy (Chemical)  
BUTT, H. G., MANUFACTURING COMPANY (Mechanical)  
CADILLAC AUTOMOBILE COMPANY (Mechanical)  
CHASE-SHAWMUT COMPANY, Newburyport (Electrical)  
COFFIN VALVE COMPANY, Neponset (Mechanical)  
CONANT MACHINE COMPANY, Concord (Mechanical)  
CONDIT ELECTRICAL MANUFACTURING COMPANY (Electrical)  
CRITTENDEN MANUFACTURING COMPANY (Mechanical)  
CROCKER, H. S., Brockton City Engineer (Civil)  
CROCKER PEN COMPANY, Everett (Mechanical)  
CROFOOT GEAR WORKS, Hyde Park (Mechanical)  
CROSBY STEAM GAGE & VALVE COMPANY, Charlestown (Mechanical)  
CROSS, W. W., Brockton (Mechanical)  
DENNISON MANUFACTURING COMPANY (Mechanical and Chemical)  
EASTMAN & BRADFORD, Civil Engineers, Lynn (Civil)  
EDISON ELECTRIC ILLUMINATING COMPANY (Electrical, Mechanical and Chemical)  
E. I. DU PONT DE NEMOURS COMPANY, Portland (Mechanical)  
ELECTRIC MAINTENANCE COMPANY (Electrical)  
ELLIOT, C. J., Civil Engineer (Civil)  
ELLIS MANUFACTURING COMPANY, Milldale, Conn. (Mechanical)  
EVANS, R., Essex County Engineer, Salem (Civil)  
FARNHAM, RALPH J., Civil Engineer, Wellesley (Civil)  
FULLER, GEORGE A., COMPANY, Constructors (Civil)  
GANNETT, CHARLES H., Civil Engineer (Civil)  
GENERAL ELECTRIC COMPANY, Lynn (Electrical, Mechanical and Chemical)  
GLENLYON DYE WORKS, Saylesville, R. I. (Chemical)  
GOLDBLATT, MAX L., Civil Engineer (Civil)  
GREEN MANUFACTURING COMPANY, Bellows Falls, Vt. (Mechanical)  
HOLTZER CABOT ELECTRIC COMPANY (Electrical)  
HOOD RUBBER COMPANY (Mechanical)  
HUME BODY CORPORATION (Mechanical)  
HUNT-SPILLER CORPORATION, Iron Founders (Chemical)  
HYGRADE LAMP COMPANY, Salem (Electrical)  
INDUSTRIAL ENGINEERING CORPORATION (Chemical)  
JENNEY ELECTRICAL MANUFACTURING COMPANY, Brockton (Electrical)  
JONSBURG, F. F., COMPANY, Engineers (Civil)

## EQUIPMENT OF THE SCHOOL

KINNEY MANUFACTURING COMPANY, Jamaica Plain (Mechanical)  
KNOTT, L. E., APPARATUS COMPANY, Cambridge (Chemical and Mechanical)  
LANDERS, FRARY & CLARKE, New Britain, Conn. (Mechanical)  
LAWTON MILLS COMPANY, Plainfield, Conn. (Mechanical)  
LEONARD ENGINEERING COMPANY, Everett (Civil)  
LEVER BROTHERS, Soap Manufacturers (Chemical)  
LEWIS, GREEN, McADAMS & KNOWLAND (Chemical)  
LEWIS-SHEPARD COMPANY (Mechanical)  
LUSTRON CHEMICAL COMPANY (Chemical)  
LYNN, CITY OF, Water Dept. (Civil)  
MANHASSETT MANUFACTURING COMPANY, Putnam, Conn. (Electrical)  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY (Chemical)  
MASSACHUSETTS PUBLIC WORKS DEPT. (Civil)  
MASSACHUSETTS STATE BOARD OF HEALTH (Civil)  
McCLINOCK & WOODFALL, Civil Engineers (Civil)  
MERCHANT, A. P., COMPANY (Electrical)  
MERRIMAC CHEMICAL COMPANY, North Woburn (Chemical)  
MERTIN, DR. RUDOLPH (Chemical)  
MONKS & JOHNSON, Structural Engineers (Civil)  
MORGAN CONSTRUCTION COMPANY, Worcester (Mechanical)  
MOSS ELECTRICAL COMPANY, Putnam, Conn. (Electrical)  
NEW ENGLAND COAL & COKE COMPANY (Chemical)  
NEW ENGLAND STRUCTURAL COMPANY (Mechanical)  
NEWTON CITY ENGINEER (Civil)  
NORFOLK IRON WORKS, Quincy (Civil)  
NORTHEASTERN COLLEGE LABORATORIES (Civil, Mechanical, Electrical and Chemical)  
NORWOOD TOWN ENGINEER (Civil)  
OLD COLONY FOUNDRY, East Bridgewater (Mechanical)  
OLD COLONY TOOL COMPANY, Taunton (Mechanical)  
PAVER'S MACHINE SHOP, Franklin (Mechanical)  
PERRY, G. W., City Engineer, Putnam, Conn. (Civil)  
PLYMOUTH CORDAGE COMPANY (Mechanical)  
PLYMOUTH RUBBER COMPANY, Canton (Chemical)  
PLYMOUTH TOWN ENGINEER (Civil)  
PNEUMATIC SCALES CORPORATION (Mechanical)  
PORTLAND SALES COMPANY, THE (Chemical and Mechanical)  
POTTER, H. S., COMPANY (Electrical)  
PUNCHARD, WILLIAM H., Landscape Architect (Civil)  
PUTNAM MACHINE COMPANY, Fitchburg (Mechanical)  
SALEM ELECTRIC LIGHT COMPANY (Electrical)  
SALEM GAS LIGHT COMPANY (Chemical)  
SAMSON ELECTRIC COMPANY, Canton (Electrical)  
SAMPSON, GEORGE T., Civil Engineer, Medford (Civil)  
SANBORN COMPANY, Instrument Manufacturers (Mechanical and Chemical)  
SHERRY, FRANK E., Civil Engineer (Civil)  
SIMPLEX ELECTRIC HEATING COMPANY, Cambridge (Electrical)  
SIMPLEX WIRE AND CABLE COMPANY, Cambridge (Electrical)  
SIMPSON BROTHERS CORPORATION (Civil)  
SOLON LUMBER COMPANY, Solon, Maine (Mechanical)  
STARRET, L. S., TOOL COMPANY, Athol (Mechanical)  
STEVENS DURYEA COMPANY, Chicopee Falls (Mechanical and Electrical)  
STURTEVANT, B. F., COMPANY, Hyde Park (Mechanical and Electrical)

## *SCHOOL OF ENGINEERING*

SYLVESTER TOWER COMPANY, Cambridge (Mechanical)  
TRIMONT MANUFACTURING COMPANY, Roxbury (Mechanical)  
TRUFANT, A. P., Civil Engineer, Brockton (Civil)  
TUCK & GILMAN, Architects (Civil)  
TURNER CONSTRUCTION COMPANY (Civil)  
UNITED SHOE MACHINERY COMPANY, Beverly (Electrical and Mechanical)  
UNITED STATES ENVELOPE COMPANY (Mechanical)  
VEGA MUSICAL INSTRUMENT COMPANY (Civil)  
VENNARD, WILLIAM L., City Engineer, Lynn (Civil)  
VICTOR SHOE MACHINERY COMPANY, Lynn (Mechanical)  
WADE AMERICAN MANUFACTURING COMPANY, Waltham (Mechanical)  
WALTHAM WATCH COMPANY, Waltham (Mechanical and Chemical)  
WARREN BROTHERS COMPANY, Paving Materials Laboratory (Chemical)  
WERBY LABORATORIES (Chemical)  
WESTINGHOUSE ELECTRIC MANUFACTURING COMPANY, Springfield (Electrical)  
WHITMAN AND HOWARD, Civil Engineers (Civil)  
WOLLASTON FOUNDRY COMPANY, Norfolk Downs (Mechanical)  
WORCESTER ELECTRIC LIGHT COMPANY (Electrical)

## *REQUIREMENTS FOR ADMISSION*

### **REQUIREMENTS FOR ADMISSION**

#### **General Statement**

In general, the preparation necessary to enable an applicant to pursue successfully one of the regular courses in the School corresponds to the four-year course of study offered by high schools of the better grade. The requirements of age and scholarship are regarded as the minimum in all ordinary cases, and only exceptional circumstances will justify any relaxation. Parents and guardians are advised that it is generally for the ultimate advantage of the student not to enter under the age of sixteen years. Every applicant must furnish references as to his character and ability, and must show cause why he may reasonably be expected to make a success of his course, both in the School and in Engineering Practice. He must be willing and able to work hard, both mentally and physically.

#### **Admission to the First Year**

Students are admitted to the first year in all courses at the opening of the Fall Term in September. At the opening of the Spring Term in January, a beginning class is also usually admitted to the Mechanical and Electrical Courses. An applicant for admission as a regular student to the School is required to present evidence of graduation from an accredited four-year high school, or the equivalent, and to have included in his course of study Algebra, as far as Quadratics, and Plane Geometry. The completion of fifteen units of preparatory subjects satisfactory to the Committee on Admission is considered equivalent qualification. Students whose high school courses have not included the required Algebra and Plane Geometry must take special entrance examinations, the dates of which are scheduled elsewhere in this catalog. Certificates of entrance examinations passed for admission to colleges, or technical schools of good standing, may be accepted in lieu of entrance examinations.

In exceptional cases a student who is not a high school graduate may be allowed to enter as a special student, but only after his case has been passed on favorably by the Committee on Admission and the Dean. Every applicant is urged to remain in high school until he is graduated even though he might be able to qualify for entrance before receiving his high school diploma.

## *SCHOOL OF ENGINEERING*

A student obtaining a low rating on his entrance examinations, or who may not be eligible to assignment to Engineering Practice for other reasons, may by special permission be allowed to attend school either every period or every alternate period. When a student's record justifies such a procedure, he may be assigned to Engineering Practice.

### **Application for Admission**

Each applicant for admission to the School is required to fill out an application blank, whereon he states his previous education, as well as the names of persons to whom reference may be made in regard to his character and previous training.

An application fee of five (\$5) dollars is required when the application is filed. This fee is non-returnable if the applicant is accepted. If he is rejected, one-half the fee will be returned.

The last page of this catalog is in the form of an application blank. It should be filled out in ink and forwarded with the required five dollar deposit, to Carl S. Ell, Dean, 316 Huntington Avenue, Boston, Mass.

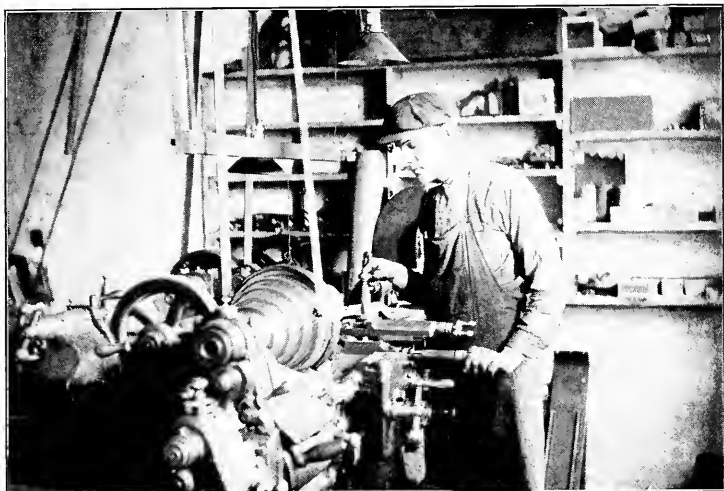
Upon receipt of the application, properly filled out, the School at once looks up the applicant's references and high school records. When replies have been received to the various inquiries instituted, the applicant is at once advised as to his eligibility for admission to the School. All applicants must meet the Dean for a personal interview before being finally accepted by the School. This interview may be postponed if desired until the opening of School in the fall.

### **First Tuition Payment**

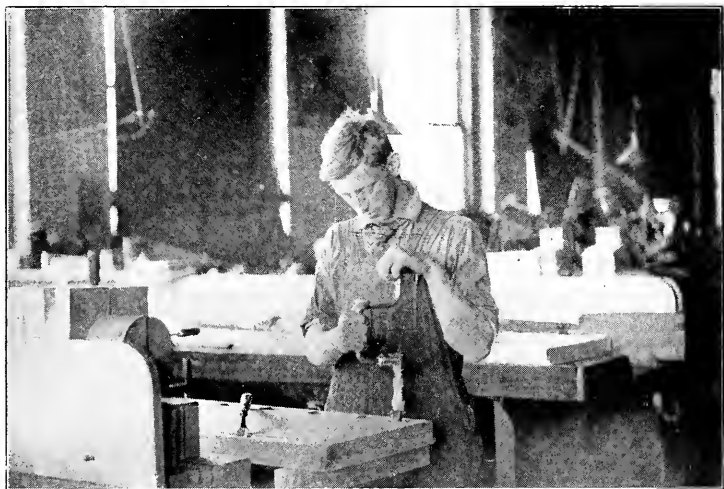
Should a student wish to be assigned to a position with a co-operating firm before the regular opening of School, he is required to fill out a registration card and also an application for membership in the Boston Y. M. C. A. The first payment of tuition must be paid before he will be assigned to any position at Engineering Practice.

Before any student shall be allowed to attend classes, he shall have made the first tuition payment. This is in addition to the application fee of five (5) dollars and the Student Activities fee of ten (10) dollars, and may be paid at any time before school opens.

# Mechanical Engineering Students

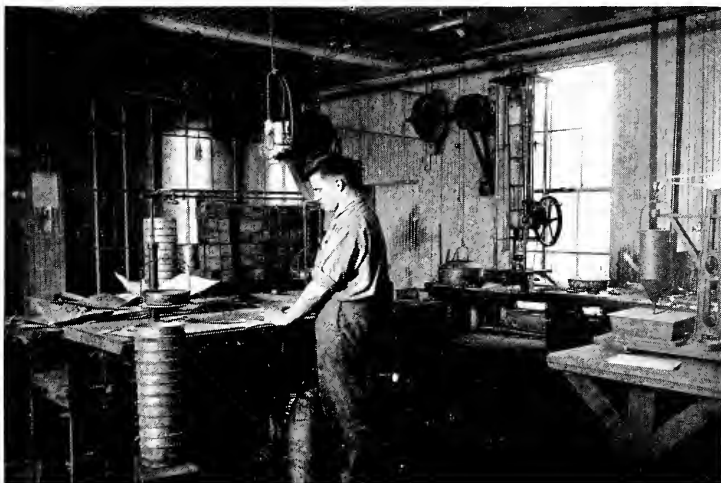


Operating a Lathe  
H. G. Butt Mfg. Company

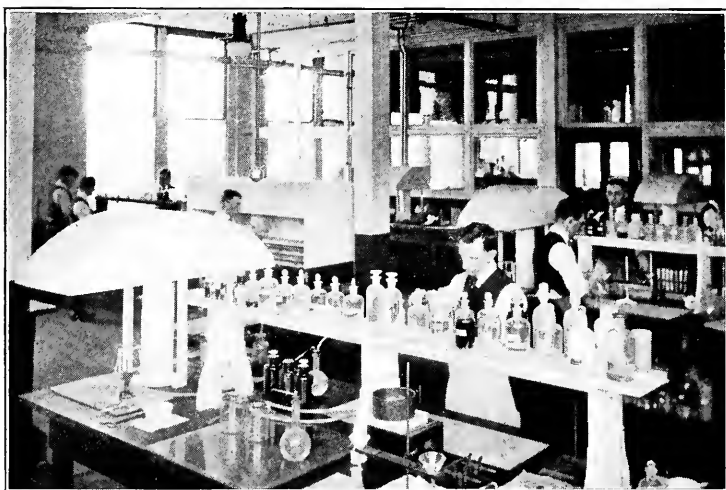


Wood Working  
Pattern Shop—Boston Elevated Railway Co.

# Chemical Engineering Students



Testing Road Materials  
Warren Bros.—Paving Materials



Analyzing Metals  
General Electric Company—Lynn

## REQUIREMENTS FOR ADMISSION

### **Birth and Educational Certificates**

The law in regard to the hours and conditions of labor by minors makes it necessary that all students under twenty-one years of age shall obtain Educational Certificates before they can be accepted by co-operating firms. For those students who live outside of Boston, it will save time and trouble if they bring a Certificate of Birth, or an Educational Certificate, with them on coming to Boston. The Educational Certificates are obtained free, upon request, from the Superintendent of Schools in the city, or town, where the student lives, if he lives in Massachusetts. For students living in other states a Certificate of Birth, or its equivalent, is all that will be necessary.

### **Subjects for Examination**

Applicants who have not passed algebra to quadratics and plane geometry satisfactorily in their courses of study in high school are required to pass entrance examinations in these subjects.

By writing the School, prospective applicants may receive copies of former entrance examinations. These copies are available for distribution and may be obtained at any time.

The detailed requirements in these subjects are as follows:

#### **Algebra**

The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one, or more, unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative.

#### **Plane Geometry**

The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas, regular polygons and the measurement of the circle. The solution of numerous original exercises, including loci problems. Applications to the mensuration of lines and plane surfaces.

## *SCHOOL OF ENGINEERING*

### **Entrance Examinations in Boston**

Examinations for admission to the first year class will be held at 316 Huntington Avenue on June 16 and on September 8, 1921.

Students are advised to attend the June examinations, if possible, in order that any deficiencies then existing may be made up in September, before entrance.

The time of examinations is as follows:

Thursdays, June 16, 1921—

10:00 a. m. to 12:00 m., Algebra;

1:00 p. m. to 3:00 p. m., Plane Geometry.

Thursday, September 8, 1921—

10:00 a. m. to 12:00 m., Algebra;

1:00 p. m. to 3:00 p. m., Plane Geometry.

No fees are to be paid at the time of the examination.

### **Summer Preparatory Schools**

There are day and evening summer preparatory schools, conducted by the Northeastern Secondary School, and students having entrance conditions, or requiring further preparation for the entrance examinations, may avail themselves of this opportunity to cover the desired work.

### **Provisional Acceptance**

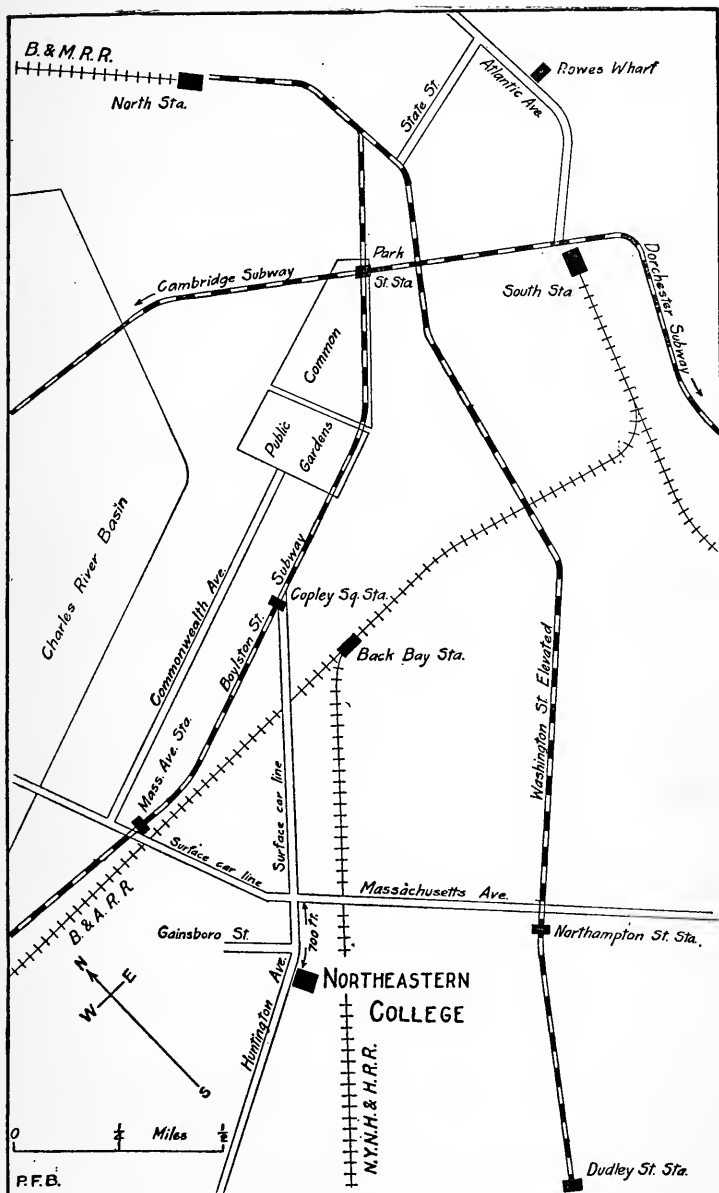
When, for any reason, it is deemed advisable, the School reserves the right to accept any entering student provisionally for a period extending from one to three months before placing him at Engineering Practice. Whether he shall be placed at work at the end of this time or not will be determined by the character of the work that he has accomplished during this provisional period.

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## **SCHOOL INFORMATION IN DETAIL**

### **Location**

The buildings are located on Huntington Avenue, at Gainsborough and St. Botolph Streets, just beyond Massachusetts Avenue, and are within easy access to the various railroad stations, and the business and residential sections. A map is shown on the opposite page.



## *SCHOOL OF ENGINEERING*

### **Residence**

It has been found to be much more satisfactory for the student to live within easy access of Boston, than to live out twenty-five or thirty miles. The saving of time and effort more than offset any increased expense.

There are excellent accommodations at very moderate rates in the dormitories in our new building. These rooms may be had separately or in groups with a common reception room. The price varies from \$2.75 per week, upwards.

Residence in the dormitories gives the student opportunity to use the drafting rooms and laboratories outside of class hours, and to confer easily with his instructors about his college work. It also gives him a wider range in the choice of a co-operating position since he can readily report for work at 7 a. m. if necessary, which is impossible for those living at a distance. Moreover dormitory residence gives the student close connection with the activities of college life, such as the college paper, orchestra, athletics and so forth.

For these reasons it is ordinarily requisite that students, especially the freshmen, shall live at the dormitories or nearby, but by special permission from the Dean arrangements can be made to live at home, and very often co-operating firms can be found nearby for such men.

The School officials have no authority in the matter of dormitory assignments. Students should write the House Secretary for rooms in the dormitories. The Y. M. C. A. maintains a registry of suitable rooms in nearby houses which may be consulted in the Social Office on the first floor.

### **School Year**

The school year is of forty-eight weeks duration divided into twenty-three weeks of school work and twenty-five weeks of engineering practice. Thus each student gets four-weeks vacation each year. The twenty-three weeks of school work consist of a Fall Term of ten weeks, a Spring Term of ten weeks, and a Summer Term of three weeks. The arrangement of these terms can be found on the yearly calendar at the front of this catalog, in different kinds of type.

## DETAILED INFORMATION

The Fall Term begins each year on the second Monday in September. This is the beginning of the school year for all students. The school year closes with a Summer Term of three weeks.

### Attendance

Students are expected to attend all exercises in the subjects they are studying, unless excused by the Registrar. Exercises are held, and students are in general expected to devote themselves to the work of the School, between 9:00 a. m. and 4:30 p. m. with a one-hour lunch period, on every week day except Saturday. Saturday classes are held only between 9:00 a. m. and 1:00 p. m.

### Four-Year Courses

The school offers regular four-year courses in four branches of engineering, leading to the following degrees:

- I. Bachelor of Civil Engineering.
- II. Bachelor of Mechanical Engineering.
- III. Bachelor of Electrical Engineering.
- IV. Bachelor of Chemical Engineering.

Descriptions of these courses and schedules showing the subjects of instruction included will be found on succeeding pages.

### Tuition Fees

The tuition fee in each course is one hundred and seventy-five dollars (\$175) per year for each of the four years and must be paid by entering students as follows: sixty dollars (\$60) before assignment to Engineering Practice or at the beginning of the first school period; fifty dollars (\$50) at the beginning of the second school period; forty dollars (\$40) at the beginning of the third school period and twenty-five dollars (\$25) at the beginning of the fourth school period.

All students who were in attendance at the School June 1, 1920, will be permitted to complete their courses of study at the same rate of tuition as was charged when they first registered in the School but all such students will be charged a tuition fee of twenty dollars (\$20) for the Summer Term in

## SCHOOL OF ENGINEERING

addition to the regular tuition. The tuition fee for all such students in the four-year courses is payable as follows: sixty dollars (\$60) at the beginning of the first school period; thirty-five dollars (\$35) at the beginning of the second school period; thirty dollars (\$30) at the beginning of the third school period, and twenty dollars (\$20) at the beginning of the fourth school period.

Failure to make the required payments on time renders the student liable to be barred from his classes or suspended from Engineering Practice until the matter has been adjusted with the Bursar.

The tuition fee includes the regular \$5.00 membership in the Boston Y. M. C. A. and the \$6.00 Gymnasium fee.

### Student Activities Fee

Each student in the School is charged a student activities' fee of ten dollars (\$10). This fee is payable at the time of registration and is non-returnable. It supports certain student activities and includes membership in the "NORTHEASTERN ENGINEERING A. A." and subscription to the school paper, the "NORTHEASTERN TECH."

### Chemical Laboratory Fee and Breakage Deposit

All students taking chemical laboratory work are required to make a deposit of five dollars (\$5) at the beginning of each year from which deductions are made for breakage and destruction of apparatus in the laboratory. Any unused portion of this deposit is returned to the student at the end of the school year. In case the charge for such breakage or destruction of apparatus is more than five dollars (\$5), the student is charged the additional amount.

Students enrolled in the course in Chemical Engineering will be charged a laboratory fee in accordance with the following rates:

<i>Course</i>	<i>Fee</i>
41-2 Inorganic Chemical Laboratory	\$ 5.00
42-2 Qualitative Analysis Laboratory	10.00
43-2 and 44-2 Quantitative and Technical Analysis combined	5.00
45-2 Organic Chemical Laboratory	10.00
45-4 Organic Chemical Laboratory	5.00
47-2 Industrial Chemical Laboratory	5.00

## DETAILED INFORMATION

### Electrical Laboratory Fee

All students taking electrical laboratory work will be charged a laboratory fee in accordance with the following rates:

<i>Course</i>	<i>Fee</i>
30-4 Applied Electricity Laboratory	\$5.00
32-2 Electrical Engineering Laboratory	2.50
32-4 Electrical Engineering Laboratory	5.00
32-6 Electrical Engineering Laboratory	5.00
32-8 Electrical Engineering Laboratory	10.00
33-2 Electrical Measurements Laboratory	5.00

### Payments

All payments should be made to Galen D. Light, Bursar.

All checks should be made payable to The Bursar, Northeastern College.

### Refunds

As the College assumes the obligation of carrying the student throughout the year when the student registers and as the College provides the instruction and accommodations on a yearly basis, the Committee on Refunds has ruled as follows:

- A. Applications for refunds must be presented within sixty days after withdrawal from school.
- B. Credits or refunds may be granted only as stated below:
  1. The unused portion of the tuition paid by the applicant may be placed in suspense and used at some future time by the applicant to apply upon tuition in any school in Northeastern College, provided it is used within two years. This action is taken providing the reasons as set forth in the application meet with the approval of the Committee on Refunds.
  2. Cash refunds may be granted only in cases where students are compelled to withdraw on account of personal illness. The application must be accompanied by a satisfactory certificate from a physician.

## *SCHOOL OF ENGINEERING*

### **Books and Supplies**

All supplies may be purchased at the College Book Store at a cost of twenty (\$20) to twenty-five dollars (\$25) per year. The supplies for the freshman year cost somewhat more than this because a set of drawing instruments must be obtained. The earnings of the students for their services with the co-operating firms considerably exceed the cost of tuition, fees, the cost of books and supplies, and incidental expenses. The purchase of supplies is therefore not a burden to the student.

### **Elective Subjects**

Students electing any subject not included in their regular schedule will be required to take all examinations in that subject, and to attain a passing grade, before they will be eligible for a degree.

### **Status of Students**

The ability of students to continue their courses is determined by means of daily work and examinations, but regularity of attendance and faithfulness to daily duties are considered equally essential.

When a student elects a course, he is required to complete all subjects in that course not indicated as "Optional," in order to be graduated. No subject is to be dropped, or omitted, without the consent of the Committee on Scholarship and the approval of the Dean.

Any student failing to make a satisfactory record, either in school or practical work, may be removed from his position in practical work, or from the school.

Students transferring from approved colleges will be admitted to advanced standing in their courses. Whenever a student enters with advanced standing and it is found that he shows inadequate preparation in any of his pre-requisite subjects, the faculty reserves the right to make the student repeat in class the pre-requisite subject in which he is deficient.

A special student is permitted to attend the School, subject to the approval of the faculty, and may be permitted to take such subjects as the School offers under the supervision of the Scholarship Committee.

## *DETAILED INFORMATION*

### **Probation**

Any student whose report of standing does not meet the standard set by the Scholarship Committee, will, except for special reasons, as, illness, enforced absence or similar causes ordinarily beyond the student's control, be placed on probation.

While on probation, a student is expected to confine himself strictly to his studies, and is debarred from representing the College in any public capacity or from taking any active part in any of the various Student Activities.

A student will only be removed from probation by action of the Scholarship Committee, in general upon a definite recommendation by his Advisor.

If a student remains upon probation for two five-week periods of his Division consecutively, he will be placed upon the list of Special Students and no longer considered as a candidate for a degree of the School. His program of studies will be reduced to such extent as the Scholarship Committee considers suitable according to their estimate of his ability.

When at the beginning of any five-week period a special student shall be found to have completed satisfactorily the required work for a degree up to said five-week period, he may be restored to the list of candidates for a degree.

### **Examinations**

Examinations covering the work of the term are usually held at the close of each term. Exceptions may be made in certain courses where, in the opinion of the instructor, examinations are not necessary.

Condition examinations for all courses are given during the afternoons of the second week in September for Division A, and of the third week in October for Division B, but condition examinations are not given for courses in which no final examination is given. Condition examinations for all courses which end with the Fall Term are also given the second week in May for Division A, and the second week in June for Division B. Special examinations can be arranged for only by vote of the Committee on Scholarship, and for all such examinations the College requires the payment of a special fee of five dollars (\$5).

## *SCHOOL OF ENGINEERING*

### **Rules of Standing in Scholarship**

A student's grade is officially recorded by letters and percentages, as follows:

A, excellent, 90-100 per cent.

B, good, 80-89 per cent.

C, fair, 70-79 per cent.

D, passable, 60-69 per cent.

E, work incomplete or unsatisfactory, 40-59 per cent.

F, complete failure, below 40 per cent.

A mark of E in any particular subject entitles the student to make up the unsatisfactory work, or to take a condition examination. This letter is given for all grades below 60 per cent on intermediate reports.

A mark of F denies the privilege of taking a condition examination, and the whole course must be repeated.

A student who does not remove a condition before that course is repeated a year later, must take the course over again. A condition in more than one subject involves the loss of the privilege of being a candidate for graduation with the student's class, and may involve the loss of assignment to Engineering Practice.

The responsibility for the removal of a condition rests with the student, who is required to ascertain when and how the condition can be removed.

No student may qualify as a candidate for a degree in any given year unless clear in all the required subjects of the lower years of his chosen course. He must also be in good standing in all courses for which he is enrolled.

Entrance requirements or preparatory subjects pursued in the School are considered as required school work.

### **Absences**

No "cuts" are allowed, and a careful record of attendance upon exercises is kept for each student. Absence from exercises regularly scheduled in any subject will seriously affect the standing of a student, and may cause the removal of the subjects from which he is absent from his schedule and the

## *DETAILED INFORMATION*

listing of these subjects as conditioned subjects. In case he presents a reasonable excuse for the absence, however, he may be allowed to make up the time lost and be given credit for the work; but he must complete the work at such time and in such manner as his instructor in the subject, with the approval of the Head of his course, shall designate. Laboratory work lost can only be made up when it is possible to arrange for the necessary time during hours when these departments are open for regularly scheduled instruction. Absences from exercises immediately preceding or following a recess are especially serious and entail severe penalizing.

Attendance at all Mass Meetings of the student body is compulsory. Exceptions to this rule are made only when the student has received permission from the Registrar, previous to the meeting from which he desires to be absent.

### **Reports of Standing**

Reports of standing of all students are issued four times a year, which will be at the end of each five-week school period. In addition to these regular stated periods, a special report on the subjects taken during the summer term will be issued immediately at the close of the summer term. All questions relative to marks are to be discussed with the student advisor who, in turn, will make all necessary recommendations to the Scholarship Committee.

When a student fails to pass in any subject, a notification may be sent to his parents, or guardian, to that effect, so that we may have the home influence exerted to bring his work up to a higher rating.

Every effort is made to keep the student up in his studies. Parents and students are always welcomed by the Dean for conference upon such matters. Special reports on a student's work will be sent to parents at any time, upon request.

Parents or guardians will be notified in all cases when students are advised, or required, to withdraw from the School.

### **Conduct**

It is assumed that students come to the School for a serious purpose, and that they will cheerfully conform to such regu-

## *SCHOOL OF ENGINEERING*

lations as may from time to time be made. In case of injury to any building, or to any of the furniture, apparatus, or other property of the School, the damage will be charged to the student, or students, known to be immediately concerned; but if the persons who caused the damage are unknown, the cost for repairs may be assessed equally upon all the students of the School.

Students are expected to behave with decorum, to obey the regulations of the School, and to pay due respect to its officers. Conduct inconsistent with the general good order of the School, or persistent neglect of work, if repeated after admonition, may be followed by dismissal, or, in case the offense be a less serious one, the student may be placed upon probation. The student so placed upon probation may be dismissed if guilty of any further offense.

It is desired to administer the discipline of the School so as to maintain a high standard of integrity and a scrupulous regard for truth. The attempt of any student to present, as his own, any work which he has not performed, or to pass any examination by improper means, is regarded as a most serious offense, and renders the offender liable to immediate expulsion. The aiding and abetting of a student in any dishonesty is also held to be a grave breach of discipline.

### **Advisors**

Upon entering the School each student is assigned to a faculty member as his Advisor, who is expected to take an active interest in the student's welfare from all points, and not only guide and assist him in the satisfactory pursuit of his studies, but keep a close watch on all matters which might tend to hamper the student in his College life and see that such hampering does not occur so far as possible.

In the upper years the function of the Advisor is somewhat different and tends more toward consultation and suggestions bearing on the student's plans and probable work after graduation.

## *DETAILED INFORMATION*

### **STUDENT ACTIVITIES**

A moderate participation in social and athletic activities is encouraged by the Faculty, although a standard of scholarship which is incompatible with excessive devotion to such pursuits is required of the students.

#### **Student Activities Committee**

The student body has organized a number of groups, or clubs, all of which come under the jurisdiction of the Student Activities Committee. This committee consists of students elected from the various classes, and has general supervision over all social functions of the School. The committee has opened a Student Activities Room, a club room for all members of the School, in which current periodicals, magazines, and engineering books of interest to the young engineer are available for the student's use during his leisure moments. The committee has also formed the Musical Clubs, which consist of an orchestra, a band, a banjo and mandolin club, and a glee club. In order to provide for the social intercourse of the students, as well as to enable the men in the different divisions to meet one another, socials and entertainments are held for their exclusive enjoyment.

#### **The Northeastern Engineering A. A.**

The athletic association consists of all members of the School. At the head of the association is the Northeastern Engineering A. A. Council, consisting of members elected from the student body. This council has complete charge of all athletics. Under the guidance of efficient athletic coaches, track, basket-ball, swimming, and baseball teams are formed and schedules are arranged with other colleges for home games and games abroad. The association also encourages wrestling, interclass baseball and football, and tennis teams. Interclass and interdivision meets are held, as well as a field day near the close of the college year.

#### **The Northeastern Tech.**

The students issue a weekly paper, called the "Northeastern Tech." Here the students have an opportunity to express their opinions on subjects relating to study, engineering prac-

## *SCHOOL OF ENGINEERING*

tice, social events, or topics of the day. In addition, pertinent articles by prominent men, as well as college notes and information, make this feature of student activities very valuable. Positions on the editorial staff of the paper are attained by competitive work.

### **Student Activities Fund Committee**

In order to finance the foregoing student activities, this Student Activities Fund Committee has been formed, and consists of elected representatives from the Student Activities Committee, the Northeastern Engineering A. A., and the Northeastern Tech. This committee apportions the Student Activities Fee among the various activities. Thus the Musical Clubs, the Student Activities Room, the athletic teams, and the college paper, are supported by proper apportionment of the ten-dollar fee paid by each student at the beginning of the college year.

### **Student Council**

This is the student governing body, and comprises the officers of the senior and junior classes and the members of the Student Activities Committee. The president of the senior class is its chairman. It has jurisdiction over all student matters, as customs, privileges, or such other matters which can appropriately be decided on by such a body.

### **The Pan-Hellenic Council**

A representative from each fraternity, as well as an elected non-fraternity man from each division make up the Pan-Hellenic Council. It has preliminary jurisdiction over laws governing the regulation of fraternities and clubs in the College.

### **The Cauldron**

"The Cauldron" is the year book of the School. It is published annually by the Senior Class, and is ready for distribution in the latter part of the spring term. This publication carries the usual review of the year's work and activities, classes, socials, etc. It also includes a complete individual history of the entire graduating class and is a souvenir highly prized in later years by all graduates.

## DETAILED INFORMATION

### Professional Society

The students in the various courses with the evening school students and alumni have organized a professional society known as the Northeastern College Engineering Society for the closer association of the students of the School, and for the discussion and consideration of various problems and new knowledge in the Engineering Field. Meetings are held every few weeks, at which the members are addressed by engineers and other men of prominence. There are four sections of the society, one for each course in the School, namely: The Civil Engineering Section, the Mechanical Engineering Section, the Electrical Engineering Section, the Chemical Engineering Section.

### REQUIREMENTS FOR GRADUATION

The School grants the degrees of :

- Bachelor of Civil Engineering.
- Bachelor of Mechanical Engineering.
- Bachelor of Electrical Engineering.
- Bachelor of Chemical Engineering.

To receive the degree of the School the student must attend the School not less than one year, which must be that immediately preceding his graduation. He must complete the prescribed studies of the four years, and must, also, pass final examinations, if required, on subjects pertaining especially to his course. In addition to this, he must complete satisfactorily a schedule of Engineering Practice under the supervision of the Faculty. The student must, also, prepare a thesis on some subject included in his course of study, or an account of some research made by him, or an original report upon some machine, a work of engineering, or an industrial plant. This thesis, or design, must be approved by the Dean. All these and records of work done in preparation of theses, are the permanent property of the School.

The degree of the School represents not only the formal completion of the subjects in the selected course of study, but also the attainment of a satisfactory standard of general efficiency. Any student who does not show in the fourth-year

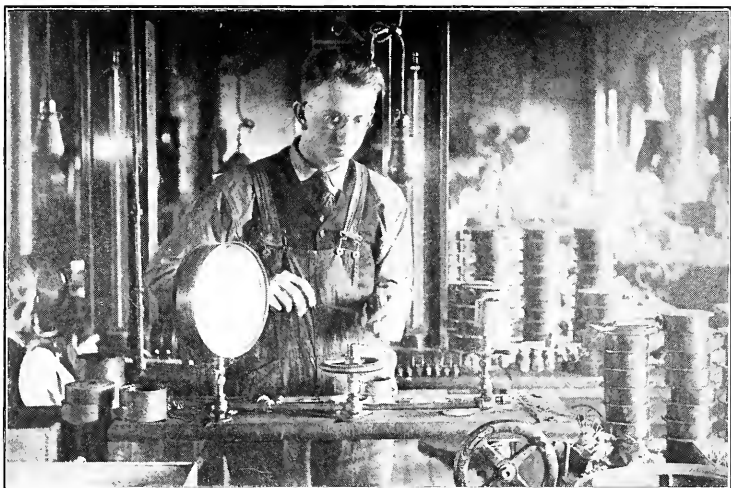
## *SCHOOL OF ENGINEERING*

work of his course that he has attained such a standard, may be required, before receiving the degree, to take such additional work as shall prove his ability. A fee of ten dollars (\$10) is required of all candidates for a degree. This fee must be paid at the beginning of the spring term.

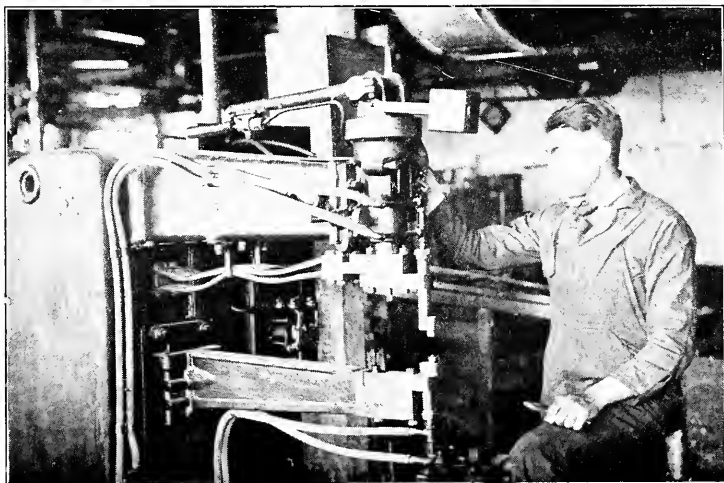
### **POSITIONS HELD BY GRADUATES**

The graduates of the School have been able to secure positions of the same grade, commanding the same salaries, as the graduates of other good technical schools. Among the positions now filled by graduates of the School are: Construction engineers, electrical engineers, power plant engineers, designing draftsmen, State and Federal employees under the Civil Service, and instructors. The success of those who have been graduated from the School is the best evidence of the value and thoroughness of the training offered.

# Electrical Engineering Students

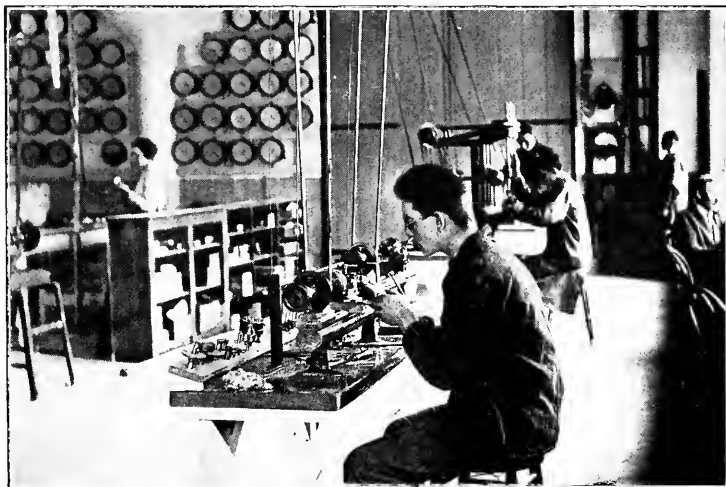


Assembling Gauges  
American Steam Gauge & Valve Co.

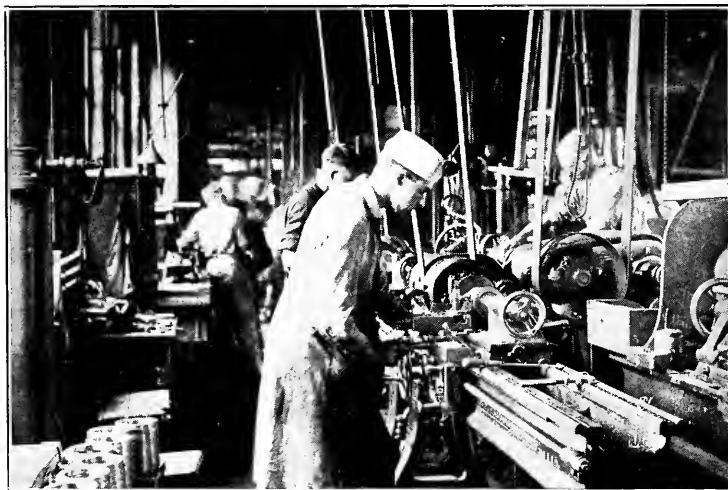


Operating a Spot Welder  
United Shoe Machinery Company—Beverly

# Mechanical Engineering Students



Finishing Gauges  
F. B. Sanborn Company



Finishing Castings  
Blanchard Machine Company—Cambridge

## GENERAL INFORMATION

### COURSES OF STUDY

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#### General Statement

The schedules of the various courses are given on the following pages. The first year, it will be observed, is practically the same in all courses. A few exceptions are made in courses where students need some special elementary training in their professional subjects, in order that they may be of more use to their employers in their Engineering Practice.

The school year comprises twenty-three weeks of class work for each division. The twenty-three weeks are divided into two terms of ten weeks each, called the Fall Term and Spring Term, and a Summer Term of three weeks. In the schedule which follows each course is followed by two numbers: the first number, under the column marked "Ex," indicates the number of hours of "exercise" in recitation, laboratory, drawing room, or field work per week; the second number, under the column marked "Prep," indicates the number of hours of outside "preparation" that have been assigned as the minimum weekly requirement for each subject. The work is so planned that the student will be required to spend from forty-eight to fifty-two hours per school week in preparation and class work. The number preceding each subject in the schedule is the number by which that subject is identified in the descriptive matter under "Subjects of Instruction."

## *SCHOOL OF ENGINEERING*

### **CIVIL ENGINEERING**

The Civil Engineering Course is designed to give the student a broad education in those subjects which form the basis of all branches of technical education, and a special training in those subjects comprised under the term "Civil Engineering." The student receives a sound training, both theoretical and practical, in the sciences upon which professional practice is based.

Civil Engineering covers such a broad field that no one can become expert in its whole extent. It includes topographical engineering, municipal engineering, railroad engineering, structural engineering, and hydraulic and sanitary engineering. It covers land surveying, the building of railroads, harbors, docks and similar structures; the construction of sewers, waterworks, roads, and streets; the design and construction of girders, roofs, trusses, bridges, buildings, walls, foundations, and all fixed structures. All of these branches of engineering rest, however, upon a relatively compact body of principles, and in these principles the students are trained by practice in the class room, drawing room, the field, and the testing laboratory.

The course is designed to prepare the young engineer to take up the work of the design and construction of structures, to aid in the location and construction of steam and electric railways, and to undertake intelligently supervision of work in the allied fields of mining, architectural, and electrical engineering, and general contracting.

# I. CIVIL ENGINEERING

## FIRST YEAR

FALL TERM		SPRING TERM	
	Hours per week Ex. Prep.		Hours per week Ex. Prep.
010-1 English .....	2 4	010-1 English .....	2 4
020-1 College Algebra .....	3 6	022-1 Analytic Geometry .....	4 6
021-1 Trigonometry .....	4 6	030-1 Physics Laboratory .....	2 2
030-1 Physics Laboratory .....	2 2	031-1 Physics .....	4 8
041-1 Mechanical Drawing .....	5 0	041-2 Mechanical Drawing .....	4 0
11-1 Surveying .....	2 4	11-1 Surveying .....	2 4
11-2 Surveying, F. & P. ....	5 0	11-2 Surveying F. & P. ....	5 0
90-1 Physical Training .....	2 0	90-1 Physical Training .....	2 0
043-1 *Descriptive Geometry ...		20 10	
061-1 *Economics and Sociology. ....		5 10	
90-1 *Physical Training .....		2 0	

## SECOND YEAR

FALL TERM		SPRING TERM	
	Hours per week Ex. Prep.		Hours per week Ex. Prep.
023-1 Calculus .....	4 6	023-2 Calculus .....	3 6
031-2 Physics Laboratory .....	2 2	032-2 Physics Laboratory .....	2 2
032-1 Light .....	3 3	032-3 Heat .....	3 4
042-1 Machine Drawing .....	3 0	042-2 Machine Drawing .....	3 0
11-3 Surveying .....	2 4	12-1 Railroad Surveying .....	3 4½
11-4 Surveying F. & P. ....	5 0	12-2 Rrd. Surveying F. & P. ....	5 0
21-1 Applied Mechanics .....	3 6	21-1 Applied Mechanics .....	3 4½
30-1 Elements of Electricity .....	2 2	30-1 Elements of Electricity .....	2 2
50-1 Engineering Conference ....	1 0	50-1 Engineering Conference ....	1 0
90-1 Physical Training .....	2 0	90-1 Physical Training .....	2 0
044-1 *Mechanism .....		15 10	
062-1 *Government .....		5 10	
90-1 *Physical Training .....		2 0	

## THIRD YEAR

FALL TERM		SPRING TERM	
	Hours per week Ex. Prep.		Hours per week Ex. Prep.
051-1 Geology .....	2 2	14-1 Theory of Structures .....	3 6
12-3 Railroad Engineering .....	2 4	14-2 Structural Drawing .....	3 3
12-4 Rrd. Engineering F. & P. ....	5 0	21-2 Strength of Materials .....	3 6
21-2 Strength of Materials .....	3 6	23-3 Heat Engineering .....	3 6
30-3 Applied Electricity .....	2 4	30-3 Applied Electricity .....	2 4
30-4 Applied Elec. Lab. ....	3 3	30-4 Applied Elec. Lab. ....	3 3
40-1 Inorganic Chemistry .....	4 4	50-1 Engineering Conference ....	1 0
50-1 Engineering Conference ....	1 0	90-1 Physical Training .....	2 0
90-1 Physical Training .....	2 0		
063-1 *History of Science .....		5 10	
13-1 *Hydraulics .....		10 20	
90-1 *Physical Training .....		2 0	

## FOURTH YEAR

FALL TERM		SPRING TERM	
	Hours per week Ex. Prep.		Hours per week Ex. Prep.
14-3 Engineering Structures .....	6 12	14-3 Engineering Structures .....	6 12
14-4 Structural Design .....	6 0	14-4 Structural Design .....	6 0
15-1 Concrete .....	2 4	15-1 Concrete .....	2 4
15-2 Concrete Design .....	3 0	15-2 Concrete Design .....	3 0
16-1 Materials .....	2 4	16-2 Testing Material Lab. ....	2 2
16-3 Foundations .....	2 2	17-1 Highway Engineering .....	2 2
50-1 Engineering Conference ....	1 0	50-1 Engineering Conference ....	1 0
51-1 Thesis .....	1 3	51-1 Thesis .....	1 6
90-1 Physical Training .....	2 0	90-1 Physical Training .....	2 0

\*Summer Term: Three weeks.

## *SCHOOL OF ENGINEERING*

### **MECHANICAL ENGINEERING**

The Mechanical Engineering course is designed to give the student a broad foundation in those fundamental subjects which form the basis for all professional engineering practice, and especially to equip the young engineer with a knowledge of the various phases of Mechanical Engineering. The course embraces instruction by text-book; lecture, laboratory, and work-shop practice, with special reference to the following branches: applied mechanics, heat engineering, industrial engineering, hydraulic engineering, applied electricity, and machine design.

The instruction aims to develop in the student the ability to think clearly and logically in the application of fundamental principles to engineering problems. The class-room work in the professional subjects is arranged with due regard to modern industrial conditions, in order that the student may connect theory with practice and appreciate the necessity of both in order to become a successful engineer. With this in view, special courses are given involving a discussion of problems which have presented themselves to the students and requiring a familiarity with the contents of current engineering periodicals. At all times it is sought to develop self-confidence in the student, and he is encouraged to take the initiative.

## II. MECHANICAL ENGINEERING

### FIRST YEAR

FALL TERM	Hours per week Ex. Prep.	SPRING TERM	Hours per week Ex. Prep.
010-1 English .....	2 4	010-1 English .....	2 4
020-1 College Algebra .....	3 6	022-1 Analytic Geometry .....	4 6
021-1 Trigonometry .....	4 6	030-1 Physics Laboratory .....	2 2
030-1 Physics Laboratory .....	2 2	031-1 Physics .....	4 8
041-1 Mechanical Drawing .....	5 0	041-3 Mechanical Drawing .....	9 0
24-1 Production Engineering .....	2 3	24-2 Production Engineering .....	2 3
40-1 Inorganic Chemistry .....	4 4	90-1 Physical Training .....	2 0
90-1 Physical Training .....	2 0		
		043-1 *Descriptive Geometry ...	20 10
		061-1 *Economics and Sociology. ...	5 10
		90-1 *Physical Training .....	2 0

### SECOND YEAR

FALL TERM	Hours per week Ex. Prep.	SPRING TERM	Hours per week Ex. Prep.
023-1 Calculus .....	4 6	023-2 Calculus .....	3 6
031-2 Physics Laboratory .....	2 2	032-2 Physics Laboratory .....	2 2
032-1 Light .....	3 3	032-3 Heat .....	3 4
042-3 Machine Drawing .....	6 0	033-1 Precision of Measurements..	1 1
044-2 Mechanism .....	4 4	044-3 Mechanism .....	6 6
21-1 Applied Mechanics .....	3 6	21-1 Applied Mechanics .....	3 4½
30-1 Elements of Electricity .....	2 2	30-1 Elements of Electricity .....	2 2
50-1 Engineering Conference .....	1 0	50-1 Engineering Conference .....	1 0
90-1 Physical Training .....	2 0	90-1 Physical Training .....	2 0
		042-4 *Machine Drawing .....	30 0
		062-1 *Government .....	5 10
		90-1 *Physical Training .....	2 0

### THIRD YEAR

FALL TERM	Hours per week Ex. Prep.	SPRING TERM	Hours per week Ex. Prep.
051-1 Geology .....	2 2	16-1 Materials .....	2 4
21-2 Strength of Materials .....	3 6	21-2 Strength of Materials .....	3 6
22-1 Graphical Analysis .....	6 2	22-2 Elem. Machine Design .....	6 2
23-1 Heat Engineering .....	3 6	23-1 Heat Engineering .....	3 6
24-3 Power Plant Equipment .....	2 4	30-3 Applied Electricity .....	2 4
30-3 Applied Electricity .....	2 4	30-4 Applied Elec. Lab. ....	3 3
30-4 Applied Elec. Lab. ....	3 3	50-1 Engineering Conference .....	1 0
50-1 Engineering Conference .....	1 0	90-1 Physical Training .....	2 0
90-1 Physical Training .....	2 0		
		063-1 *History of Science .....	5 10
		11-5 *Surveying .....	5 0
		13-1 *Hydraulics .....	10 20
		90-1 *Physical Training .....	2 0

### FOURTH YEAR

FALL TERM	Hours per week Ex. Prep.	SPRING TERM	Hours per week Ex. Prep.
13-2 Hydraulic Motors .....	2 4	15-1 Concrete .....	2 4
15-1 Concrete .....	2 4	15-2 Concrete Design .....	3 0
15-2 Concrete Design .....	3 0	22-3 Machine Design .....	6 4
22-3 Machine Design .....	6 2	24-5 Journals and Reports .....	1 3
23-2 Engineering Laboratory .....	2 2	24-6 St'd. Eng. Prod. and Proc. ....	2 4
23-5 Heat Engineering .....	2 4	25-1 Industrial Plants .....	4 4
24-4 Journals and Reports .....	1 3	50-1 Engineering Conference .....	1 0
25-1 Industrial Plants .....	3 5	51-1 Thesis .....	1 8
50-1 Engineering Conference .....	1 0	90-1 Physical Training .....	2 0
51-1 Thesis .....	1 3		
90-1 Physical Training .....	2 0		

\*Summer Term: Three weeks.

## *SCHOOL OF ENGINEERING*

### **ELECTRICAL ENGINEERING**

Probably none of the branches of scientific knowledge has been so markedly modified during the past decade as that relating to Electricity, nor has any other exerted such a profound influence upon the scientific thought of the period. A science, like a planet, grows in the main by a process of infinitesimal accretion. Its theory is built like a cathedral through the addition by many builders of many different elements, and this is pre-eminently true of Electricity. It is absolutely essential that the electrical engineer who hopes to make a success of his work should be able to grasp readily and absorb effectively the meaning and content of the many scientific memoirs recording the results of research bearing upon and directly influencing his chosen branch of engineering.

He must have a thorough appreciation of physical theory, a clear understanding of chemical principles, and a broad working knowledge of mathematics. It is essential that each student planning to take this course should realize the fundamental necessity of obtaining a solid grounding in these three subjects upon which the success of his future work will definitely hinge, nor can he be too strongly urged to include physics in his high school preparatory course if he hopes to avoid difficulty in the earlier years.

It is not the purpose of the course to attempt the impossible in aiming to turn out electrical engineers, fully trained in all the branches of the science, especially as it is becoming daily more differentiated and specialized. The course is designed rather to lay a broad and secure foundation for future progress along the lines of activity which may particularly appeal to each individual student and give him a good working knowledge of the essential principles which underlie each of the more specialized branches of professional work.

Parallel with the theoretical work, runs a carefully planned course of laboratory instruction which is intended to develop the student's power of accurate observation, of planning work and methods of procedure for himself with due regard to saving of time and labor and precision of the results attained.

### III. ELECTRIAL ENGINEERING

#### FIRST YEAR

FALL TERM		SPRING TERM	
	Hours per week Ex. Prep.		Hours per week Ex. Prep.
010-1 English .....	2 4	010-1 English .....	2 4
020-1 College Algebra .....	3 6	022-1 Analytic Geometry .....	4 6
021-1 Trigonometry .....	4 6	030-1 Physics Laboratory .....	2 2
030-1 Physics Laboratory .....	2 2	031-1 Physics .....	4 8
041-1 Mechanical Drawing .....	5 0	041-3 Mechanical Drawing .....	9 0
31-1 Elem. of Elec. Engineering .....	2 3	32-1 Electrical Engineering .....	2 3
40-1 Inorganic Chemistry .....	4 4	32-2 Elec. Eng. Lab. ....	3 0
90-1 Physical Training .....	2 0	90-1 Physical Training .....	2 0
	043-1 *Descriptive Geometry .....	20 10	
	061-1 *Economics and Sociology .....	5 10	
	90-1 *Physical Training .....	2 0	

#### SECOND YEAR

FALL TERM		SPRING TERM	
	Hours per week Ex. Prep.		Hours per week Ex. Prep.
023-1 Calculus .....	4 6	023-2 Calculus .....	3 6
031-2 Physics Laboratory .....	2 2	032-2 Physics Laboratory .....	2 2
032-1 Light .....	3 3	032-3 Heat .....	3 4
042-3 Machine Drawing .....	6 0	033-1 Precision of Measurements .....	1 1
21-1 Applied Mechanics .....	3 6	21-1 Applied Mechanics .....	3 4½
32-3 Electrical Engineering .....	3 5	32-4 Elec. Eng. Lab. ....	3 3
32-4 Elec. Eng. Lab. ....	3 3	32-5 Electrical Engineering .....	4 8
50-1 Engineering Conference .....	1 0	50-1 Engineering Conference .....	1 0
90-1 Physical Training .....	2 0	90-1 Physical Training .....	2 0
	044-1 *Mechanism .....	15 10	
	062-1 *Government .....	5 10	
	90-1 *Physical Training .....	2 0	

#### THIRD YEAR

FALL TERM		SPRING TERM	
	Hours per week Ex. Prep.		Hours per week Ex. Prep.
21-3 Strength of Materials .....	3 6	16-1 Materials .....	2 4
23-1 Heat Engineering .....	3 6	23-1 Heat Engineering .....	3 6
32-6 Elec. Eng. Lab. ....	6 3	32-6 Elec. Eng. Lab. ....	6 3
32-7 Electrical Engineering .....	4 6	32-7 Electrical Engineering .....	4 6
33-1 Elec. Measurements .....	2 3	33-1 Elec. Measurements .....	2 3
33-2 Elec. Measurements Lab. ....	3 2	33-2 Elec. Measurements Lab. ....	3 2
50-1 Engineering Conference .....	1 0	50-1 Engineering Conference .....	1 0
90-1 Physical Training .....	2 0	90-1 Physical Training .....	2 0
	063-1 *History of Science .....	5 10	
	11-5 *Surveying .....	5 0	
	13-1 *Hydraulics .....	10 20	
	90-1 *Physical Training .....	2 0	

#### FOURTH YEAR

FALL TERM		SPRING TERM	
	Hours per week Ex. Prep.		Hours per week Ex. Prep.
13-2 Hydraulic Motors .....	2 4	24-6 St'd. Eng. Prod. and Proc. ....	2 4
23-2 Engineering Laboratory .....	2 2	32-8 Elec. Eng. Lab. ....	6 3
32-8 Elec. Eng. Lab. ....	6 3	32-9 Elec. Engineering .....	4 8
32-9 Elec. Engineering .....	4 8	34-1 Elec. Engineering .....	4 6
34-1 Elec. Engineering .....	4 6	35-1 Advanced Electricity .....	2 3
35-1 Advanced Electricity .....	2 3	50-1 Engineering Conference .....	1 0
50-1 Engineering Conference .....	1 0	51-1 Thesis .....	1 6
51-1 Thesis .....	1 3	90-1 Physical Training .....	2 0
90-1 Physical Training .....	2 0		

\*Summer Term: Three weeks.

## *SCHOOL OF ENGINEERING*

### **CHEMICAL ENGINEERING**

The efficiency of any industrial chemical enterprise depends not only upon a knowledge of the chemical reactions forming the basis of the process, but also upon a knowledge of the mechanical principles on which depend the design, construction and maintenance of the plant for the carrying on of these reactions. Owing to the keen competition among industries which must follow the abnormal war-time production, it will be necessary to maintain the highest possible efficiency.

The purpose of this course is to prepare students capable of filling the demand for trained men competent to build and operate manufacturing industries based upon chemical principles at their maximum efficiency. The professional work of the course falls naturally into three groups: First, courses which provide a knowledge of the fundamental principles of chemistry. Second, those courses which furnish a knowledge of mechanical engineering subjects. Third, engineering practice in which the student becomes familiar with the many applications of theoretical principles.

The laboratory work has been planned not only to familiarize the student with many types of chemical compounds and apparatus, but also to train the student to be an exact and logical thinker, and to encourage a desire for the application of his knowledge and training to the investigation and solution of the many problems which modern industry presents.

## IV. CHEMICAL ENGINEERING

### FIRST YEAR

FALL TERM	Hours per week Ex. Prep.	SPRING TERM	Hours per week Ex. Prep.
010-1 English .....	2 4	010-1 English .....	2 4
020-1 College Algebra .....	3 6	022-1 Analytic Geometry .....	4 6
021-1 Trigonometry .....	4 6	030-1 Physics Laboratory .....	2 2
030-1 Physics Laboratory .....	2 2	031-1 Physics .....	4 8
041-1 Mechanical Drawing .....	5 0	041-2 Mechanical Drawing .....	4 0
41-1 Inorganic Chemistry .....	4 4	41-1 Inorganic Chemistry .....	4 4
41-2 Inorganic Chem. Lab. ....	5 0	41-2 Inorganic Chem. Lab. ....	5 0
90-1 Physical Training .....	2 0	90-1 Physical Training .....	2 0
043-1 *Descriptive Geometry ...		20	10
061-1 *Economics and Sociology. ....		5	10
90-1 *Physical Training .....		2	0

### SECOND YEAR

FALL TERM	Hours per week Ex. Prep.	SPRING TERM	Hours per week Ex. Prep.
023-1 Calculus .....	4 6	023-2 Calculus .....	3 6
031-2 Physics Laboratory .....	2 2	032-2 Physics Laboratory .....	2 2
032-1 Light .....	3 3	032-3 Heat .....	3 4
042-1 Machine Drawing .....	3 0	042-2 Machine Drawing .....	3 0
21-1 Applied Mechanics .....	3 6	21-1 Applied Mechanics .....	3 4½
30-1 Elements of Electricity ....	2 2	30-1 Elements of Electricity ....	2 2
42-1 Qualitative Analysis .....	2 4	42-1 Qualitative Analysis .....	2 4
42-2 Qualitative Anal. Lab. ....	5 0	42-2 Qualitative Anal. Lab. ....	5 0
50-1 Engineering Conference ....	1 0	50-1 Engineering Conference ....	1 0
90-1 Physical Training .....	2 0	90-1 Physical Training .....	2 0
044-1 *Mechanism .....		15	10
062-1 *Government .....		5	10
90-1 *Physical Training .....		2	0

### THIRD YEAR

FALL TERM	Hours per week Ex. Prep.	SPRING TERM	Hours per week Ex. Prep.
21-3 Strength of Materials .....	3 6	23-3 Heat Engineering .....	3 6
30-3 Applied Electricity .....	2 4	30-3 Applied Electricity .....	2 4
30-4 Applied Elec. Lab. ....	3 3	30-4 Applied Elec. Lab. ....	3 3
43-1 Quantitative Analysis .....	2 4	44-1 Technical Analysis .....	2 4
43-2 Quantitative Anal. Lab. ....	5 0	44-2 Technical Anal. Lab. ....	5 0
45-1 Organic Chemistry .....	3 6	45-1 Organic Chemistry .....	3 6
45-2 Organic Chem. Lab. ....	5 0	45-2 Organic Chem. Lab. ....	5 0
50-1 Engineering Conference ....	1 0	50-1 Engineering Conference ....	1 0
90-1 Physical Training .....	2 0	90-1 Physical Training .....	2 0
063-1 *History of Science .....		5	10
13-1 *Hydraulics .....		10	20
90-1 *Physical Training .....		2	0

### FOURTH YEAR

FALL TERM	Hours per week Ex. Prep.	SPRING TERM	Hours per week Ex. Prep.
45-3 Organic Chemistry .....	2 4	45-3 Organic Chemistry .....	2 4
45-4 Organic Chem. Lab. ....	5 0	45-4 Organic Chem. Lab. ....	5 0
46-1 Chemical Engineering .....	3 6	46-1 Chemical Engineering .....	3 6
47-1 Industrial Chemistry .....	3 3	47-1 Industrial Chemistry .....	3 3
47-2 Industrial Chem. Lab. ....	8 0	48-1 Physical Chemistry .....	4 8
48-1 Physical Chemistry .....	4 8	50-1 Engineering Conference ....	1 0
50-1 Engineering Conference ....	1 0	51-1 Thesis .....	1 10
90-1 Physical Training .....	2 0	90-1 Physical Training .....	2 0

\*Summer Term: Three weeks.

## *SCHOOL OF ENGINEERING*

### **SUBJECTS OF INSTRUCTION**

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Instruction is given by lectures and recitations, and by practical exercises in the field, in the laboratories, and in the drawing rooms. A great value is set upon the educational effect of these exercises, and they form the foundation of each of the four courses. In many branches the instruction given differs widely from available texts in which cases notes on the lectures and laboratory work are usually issued to the students. Besides oral examinations in connection with the ordinary exercises, written examinations are held from time to time.

In the following pages will be found a more or less detailed statement of the scope of the subjects offered in the various courses. The subjects are classified, as far as possible, related studies being arranged in sequence. The subjects are numbered for convenience in consulting the various Course Schedules. A complete table of the Subjects of Instruction will be found at the end of the book. Under each subject is given a list of the subjects required as preparation for that subject. These requirements are made as it is felt that the student must have become proficient in all these subjects for a clear comprehension of the advanced work. In some cases, the required preparation may be taken simultaneously and must be completed before further advanced work is undertaken.

Students electing any subject must complete that subject in order to be a candidate for a degree.

By careful consideration of the Course Schedules, in connection with the following Synopsis of Courses, the applicant for a special course may select, for the earlier part of that course, such subjects as will enable him to pursue later those more advanced subjects which he may particularly desire. Applications for exception from the required preparation as stated in connection with each subject described below, will be passed on by the Faculty.

The topics included in the list which follows are subject to change at any time by action of the School authorities.

## SYNOPSIS OF COURSES

### SYNOPSIS OF COURSES

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In the following synopsis under each subject, "Courses" refers to the four principal courses of Civil I, Mechanical II, Electrical III, and Chemical IV, in which that particular subject is required. The subjects themselves are arranged in groups according to the departments under which the subject falls. The "year and term" refer to the time when the subject is ordinarily taken under the regular schedule, "both terms" referring to both the Fall and Spring terms and "Summer Term" referring to the three week term given after the close of the Spring term for Division A and before the Fall term for Division B. "Preparation" gives the subjects by number that the student must have taken and passed satisfactorily before he may be permitted to take the subject under discussion, except in a few stated cases where the preparation may be taken simultaneously. The number of "hours per week" refers to the hours of class room or laboratory work and does not include the hours of outside preparation. The main body of the synopsis shows in a brief form the ground covered by the course. At the end of the synopsis is given the names of the instructors for that particular subject; the first named being in charge.

#### 010-1 ENGLISH

*Courses: I, II, III, IV*

*First year, both terms*

*Preparation: — —*

*Two hours per week*

English Composition: An elementary course especially adapted to the needs of men who expect to follow the engineering profession. Watt's "The Composition of Technical Papers" forms the basis of the course. The work consists of lectures, recitations, class discussions, weekly themes, tests, reports, and a limited amount of outside reading, particularly in modern scientific journals. The material for the themes is entirely drawn from, or related to, the student's study in the laboratory and experience in his Engineering Practice with the co-operating firm.

MR. MELVIN

## SCHOOL OF ENGINEERING

### 020-1 COLLEGE ALGEBRA

*Courses: I, II, III, IV*

*Preparation: —*

*First year, fall term*

*Three hours per week*

Beginning with quadratic equations, the student has an opportunity to review the various operations of simpler algebra. The course also includes a study of the theory of exponents, series, determinants, principles of theory of equations, graphs, permutations and combinations, and principles of vector analysis.

### 021-1 TRIGONOMETRY

*First year, fall term*

*Preparation: —*

*Courses: I, II, III, IV*

*Four hours per week*

Trigonometric functions as ratios; transformation and solution of trigonometric equations; inverse functions; circular functions; goniometry; logarithms; solution of exponential equations; solution of right and oblique triangles; law of sines, cosines, and tangents; areas. Considerable practice in calculation of practical problems enables the student to apply his trigonometry to problems arising in Engineering Practice at an early stage. Explanation of laws of spherical trigonometry.

PROFESSORS SPEAR AND PUGSLEY.

### 022-1 ANALYTIC GEOMETRY

*Courses: I, II, III, IV*

*Preparation: 020-I, 021-I*

*First year, spring term*

*Four hours per week*

Cartesian and polar co-ordinates. The equations of straight lines and simpler curves derived from the geometric properties of the curves. Properties of curves derived from their equations. Thorough study of straight line, circle, and conic sections. Intersection of curves, transformation of axes. Plotting of polynomials including exponential, trigonometric, and logarithmic functions. Loci problems. An endeavor is made to develop the analytic sense in the student throughout the course, rather than to rely on the use of formulae.

PROFESSOR SPEAR,  
MR. PORTER.

## SYNOPSIS OF COURSES

### 023-1 DIFFERENTIAL CALCULUS

*Courses: I, II, III, IV*

*Preparation: 022-1*

*Second year, fall term*

*Four hours per week*

Theory of limits; rates of change; differentiation of algebraic, trigonometric, exponential, and logarithmic functions; slopes of curves; maxima and minima, with practical problems; partial differentiation; derivatives of higher order; lengths of curves; radius of curvature, etc.; expansion of functions, series.

Although the subject matter of the course deals with considerable theory, constant sight is kept of the practical application of all the theory. The geometric interpretation of every new subject is carefully defined, and problems are continually solved dealing in practical applications of theory. Velocity and acceleration problems in mechanics are typical of those used for application of differentiation.

PROFESSOR SPEAR.

### 023-2 INTEGRAL CALCULUS

*Courses: I, II, III, IV*

*Preparation: 023-1*

*Second year, spring term*

*Three hours per week*

A continuation of Course 023-1. Integration as the inverse of differentiation; intergration as a summation; definite integrals; use of tables; double and triple integrals; areas in rectangular and polar co-ordinates; volumes; center of gravity; moment of inertia. Practical problems depending on the differential and integral calculus for solution. Solution of simpler differential equations.

PROFESSOR SPEAR.

### 030-1 PHYSICS LABORATORY

*Courses: I, II, III, IV*

*Preparation: —*

*First year, both terms*

*Two hours per week*

A series of twenty-five experiments of an elementary grade for those students who are found to be deficient in the simpler fundamentals of Physics. This course gives the students a thorough preparation for their work in Courses 031-2 and 032-2.

MR. GIRARD.

## SCHOOL OF ENGINEERING

### 031-1 PHYSICS

*Courses: I, II, III, IV*

*Preparation: 02I-I*

*First year, spring term*

*Four hours per week*

A study of the principles of mechanics, statics and dynamics. The subjects studied are: Equilibrium of bodies acted upon by parallel forces, equilibrium of bodies acted upon by concurrent forces, vectors, relative velocities, uniform velocity, uniformly accelerated motion, projectiles, simple harmonic motion, motion on an inclined plane, energy, work, horse-power, angular velocity and acceleration, moment of inertia, kinetic energy of rotation, centrifugal force, fluid pressure, density and specific gravity of solids and liquids, Boyles law, and hydrometers. It is the purpose of the course to lay a thorough foundation for subsequent study of experimental and technical physics. Hence it is planned with immediate reference to familiarize the pupil with the fundamental principles of the science.

PROFESSOR COOLIDGE,

MR. STEARNS.

### 031-2 PHYSICS LABORATORY

*Courses: I, II, III, IV*

*Preparation: 030-I, 03I-I*

*Second year, fall term*

*Two hours per week*

Experiments on Mechanics performed by each student, supplementing the lecture and class room work in Physics 031-1. The experiments include the use of verniers, micrometers, and spherometers, calculation of true weights, determination of specific gravities of solids by various methods, areas by planimeter, modulus of elasticity, and motion on an inclined plane.

MR. GIRARD.

### 032-1 LIGHT

*Courses: I, II, III, IV*

*Preparation: 03I-I*

*Second year, fall term*

*Two hours per week*

The study of Light, including wave motion, mirrors, refraction, lenses, optical instruments, dispersion, interference, diffraction, and polarization of light.

PROFESSOR COOLIDGE.

## SYNOPSIS OF COURSES

### 032-2 PHYSICS LABORATORY

*Courses: I, II, III, IV*

*Preparation: 032-1, 032-3  
taken concurrently*

*Second year, spring term*

*Two hours per week*

A series of experiments on Light and Heat to supplement the work done in Physics 032-1 and Physics 032-3. The experiments on Light include the determination of the index of refraction of a lens, the position of images in combinations of lenses, and the uses of the spectrometer and spectroscope. The experiments on Heat include the calibration of a thermometer, determination of the temperature of a mixture, the relations between the pressure and boiling point of water, and the use of the air thermometer.

MR. GIRARD.

### 032-3 HEAT

*Courses: I, II, III, IV*

*Preparation: 031-1*

*Second year, spring term*

*Two hours per week*

The topics studied are: thermometry, expansion of solids, liquids and gases, calorimetry, change of state including latent heat of fusion and vaporization (sublimation), triple point diagram, conduction and radiation, and the mechanical equivalent of heat.

PROFESSOR COOLIDGE.

### 033-1 PRECISION OF MEASUREMENTS

*Courses: II, III*

*Preparation: 023-1*

*Second year, spring term*

*One hour per week*

A thorough discussion of the fundamentals of the Theory of Measurements, including a study of the Sources of Error, the Best Representative Value of the result of a series of measurements, the determination of the several Precision Measures of the result of one's work; the converse problem of how best to proceed in order to reach a given degree of precision, and a thorough consideration of the proper use of Significant Figures.

PROFESSOR SMITH.

## SCHOOL OF ENGINEERING

### 041-1 MECHANICAL DRAWING

*Courses: I, II, III, IV*

*Preparation: —*

*First year, fall term*

*Five hours per week*

An elementary course in the fundamentals of mechanical drawing, embracing exercises in the proper use and care of drafting tools, a thorough study of the principles of orthographic projection with special attention to their application to engineering drawing, lettering, dimensioning, and tracing. The work is planned on the assumption that the student understands simple geometrical constructions as studied in plane geometry.

PROFESSORS ASHLEY AND GEE.

### 041-2 MECHANICAL DRAWING

*Courses: I, IV*

*Preparation: 041-1*

*First year, spring term*

*Four hours per week*

A continuation of Course 041-1, comprising problems in the development of solids, examples in isometric drawing, and perspective.

PROFESSORS ASHLEY AND GEE.

### 041-3 MECHANICAL DRAWING

*Courses: II, III*

*Preparation: 041-1*

*First year, spring term*

*Nine hours per week*

A continuation of Course 041-1, comprising problems in the development of solids, examples in isometric drawing, perspective, screw threads, bolts and nuts, and simple machine parts.

PROFESSORS ASHLEY AND GEE.

### 042-1 MACHINE DRAWING

*Courses: I, IV*

*Preparation: 041-2*

*Second year, fall term*

*Three hours per week*

An elementary machine drawing course comprising a thorough study of screws, bolts and nuts, drafting conventions, and sections.

PROFESSORS ASHLEY AND GEE.

# Civil Engineering Students



Giving Lines and Grades for Concrete Construction  
Turner Construction Company

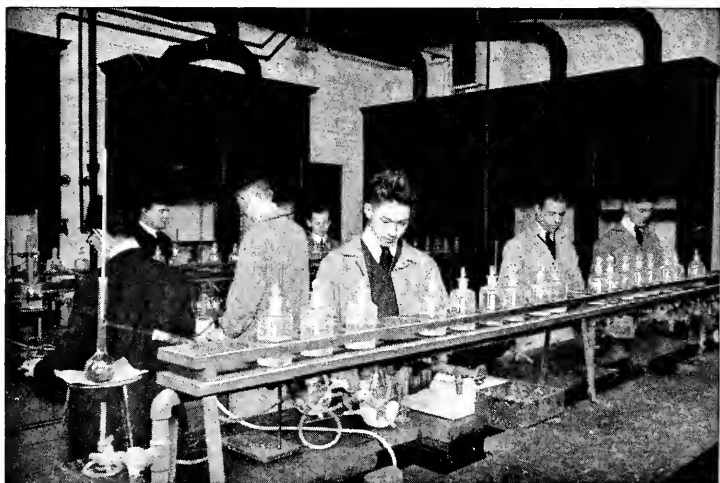


Making a Stadia Survey  
Class in Surveying Fieldwork

# Chemical Engineering Students



Calorimeter Testing  
Industrial Engineering Corporation



Class in Quantitative Analysis  
Chemical Laboratory

## SYNOPSIS OF COURSES

### 042-2 MACHINE DRAWING

*Courses: I, IV*

*Second year, spring term*

*Preparation: 042-1*

*Three hours per week*

Detailing and assembling of simple machines from sketches and drawings.

PROFESSORS ASHLEY AND GEE.

### 042-3 MACHINE DRAWING

*Courses: II, III*

*Second year, fall term*

*Preparation: 041-3*

*Six hours per week*

Reading and translating drawings. Detailed and assembly drawings of machine parts and simple machines are made from freehand sketches and other data, but nothing in the nature of a copy is permitted. The course is designed to give a thorough foundation for the study of machine design.

PROFESSORS ASHLEY AND GEE.

### 042-4 MACHINE DRAWING

*Course: II*

*Second year, summer term*

*Preparation: 042-3*

*Thirty hours per week*

The work here is conducted according to the methods of progressive draftsmen, great emphasis being laid on completeness and accuracy in the use of drawing as a language. A complete machine, such as a lathe, automobile engine, or a simple steam engine is studied by making freehand detail sketches from the individual pieces and afterward mechanically drawing the details from the freehand sketches, and the assembly drawing from the finished details.

PROFESSORS ASHLEY AND GEE.

### 043-1 DESCRIPTIVE GEOMETRY

*Courses: I, II, III, IV*

*First year, summer term*

*Preparation: 041-1*

*Twenty hours per week*

A study of the principles of descriptive geometry and their application to engineering by the solution of many problems in which theory and practice are closely correlated. Classroom exercises are devoted entirely to drafting board problems, preparation for which is obtained by the outside study of textbook references and practice problems.

PROFESSORS ASHLEY AND GEE.

## SCHOOL OF ENGINEERING

### 044-1 MECHANISM

*Courses: I, III, IV*

*Preparation: 041-2 or 041-3*

*Second year, summer term*

*Fifteen hours per week*

An introductory course conducted mainly by graphical methods and dealing with gear trains, velocity ratios, paths of mechanical movements and their application to velocity diagrams, and cams.

PROFESSOR ASHLEY.

### 044-2 MECHANISM

*Course: II*

*Preparation: 041-3*

*Second year, fall term*

*Four hours per week*

An introductory course conducted mainly by graphical methods and dealing with gear trains, velocity ratios, paths of mechanical movements and their application to velocity diagrams, quick-return mechanisms, and cams. The first part of the course is identical with Course 044-1.

PROFESSOR ASHLEY.

### 044-3 MECHANISM

*Course: II*

*Preparation: 044-2*

*Second year, spring term*

*Six hours per week*

A continuation of Course 044-2, embracing the careful study of gear-tooth outlines, and an introduction to the subject of valve gear diagrams.

PROFESSOR ASHLEY.

### 051-1 GEOLOGY

*Courses: I, II*

*Preparation: —*

*Third year, fall term*

*Two hours per week*

Earth movements and the various terrestrial applications of solar energy. The more important geological processes, erosion, sedimentation, deformation, and eruption are taken up and discussed. The latter part of the course is devoted to lectures on the broader structural features of the earth's crust and the application of the principles of structural geology to practical engineering problems.

PROFESSOR PUGSLEY.

## SYNOPSIS OF COURSES

### 061-1 ECONOMICS

*Courses: I, II, III, IV*

*Preparation: — —*

*First year, summer term*

*Five hours per week*

A rapid survey of the elementary principles of economics, such as those of wealth, labor, capital, value, price, and so forth. Particular attention is paid to the consideration of money, the mechanism of exchange, banking and its relation to the finances of corporations. In studying the distribution of wealth, considerable attention is paid to the questions of wages and value, and their relation to business profits.

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### 062-1 GOVERNMENT

*Courses: I, II, III, IV*

*Preparation: — —*

*Second year, summer term*

*Five hours per week*

The theory and practice of government in the existing forms of national organization in the United States and Great Britain. The relations between the executive, the legislature, and the judiciary will form the basis of investigation. In the lectures additional illustrative material will be taken from France, the former German Empire, and the German Commonwealth. It is hoped that the men will look on the study of government, not as academic but as practical, through constant reference to contemporary men and affairs.

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### 063-1 HISTORY OF SCIENCE

*Courses: I, II, III, IV*

*Preparation: — —*

*Third year, summer term*

*Five hours per week*

The aim is to give a broad view of the growth of science, extend the range of the students' interests, and encourage discriminating scientific reading. Considerable collateral reading is required of the students.

PROFESSOR DURKEE.

### 064-1 GERMAN

*Course: IV*

*Preparation: — —*

*Fourth year, both terms*

*Two hours per week*

All students in the Chemical Engineering Course are required to show before graduation a sufficient knowledge of the German language to be able to read technical books and scientific

## SCHOOL OF ENGINEERING

articles written in the German language. For students who have not obtained this knowledge before entering college, this course will offer a study of grammatical forms, syntax, and vocabulary through composition exercises and rapid reading. The entire purpose is to give the student a knowledge of German grammar with a working vocabulary of scientific terms.

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### 11-1 SURVEYING

*Course: I*

*Preparation: — —*

*First year, both terms*

*Two hours per week*

Lectures, recitations, and problem work in which the following subjects are considered: the chain, tape, compass, transit and level, methods of making and computing both closed and random traverses, location of buildings and points, surveying for deeds, city surveying, U. S. system of public land surveying, differential and profile levelling, theory and use of contours and contour maps, computation of earthwork, stadia methods and various special problems.

PROFESSOR NASH.

### 11-2 SURVEYING, FIELD WORK AND PLOTTING

*Course: I*

*Preparation: II-I*

*taken concurrently*

*First year, both terms*

*Five hours per week*

Two afternoons per week throughout the year are devoted to preliminary practice with the standard surveying instruments. The work depends upon, and is closely allied to, the theoretical work in Course 11-1. The student first practises chaining and taping, then learns to use the compass for reading magnetic bearings. Next he runs a closed compass and tape traverse. Then follows practice with the transit, level and tape. The last problem in the Fall is a large transit and tape closed traverse. This traverse is balanced, plotted, and completed as a map during the winter. Work is also done on contour maps and problems. In the spring, more work is taken up in differential and profile leveling, locating of contours, transit and stadia methods, and various special problems such as layout of line and grade for a sewer or a building, and cross sectioning a borrow pit.

PROFESSOR ALVORD.

## SYNOPSIS OF COURSES

### 11-3 SURVEYING

*Course: I*

*Preparation: 11-1, 11-2*

*Second year, fall term*

*Two hours per week*

The student is taught the theory of plane and geodetic triangulation, the theory of the sextant, the theory of plane table topographical surveying, the adjustments of instruments, and the methods of stellar observation for the determination of azimuth. Surveying problems in review of the elementary work are assigned to make sure that the student has a comprehensive and accurate knowledge of the art.

PROFESSOR ALVORD.

### 11-4 SURVEYING, FIELD WORK AND PLOTTING

*Course: I*

*Preparation: 11-3*

*taken concurrently*

*Second year, fall term*

*Five hours per week*

The work follows closely and is dependent upon the theoretical work of Course 11-3. Actual practice is given in triangulation, work with the sextant, plane table, field adjustments of transit and level, and an observation on polaris for latitude and azimuth.

PROFESSOR ALVORD.

### 11-5 SURVEYING

*Courses: II, III*

*Preparation: 021-1*

*Third year, summer term*

*Five hours per week*

Surveying field work during the Summer Term is designed to give the students instruction in the essential principles of surveying. It includes practice in the use of the transit and level.

### 12-1 RAILROAD SURVEYING

*Course: I*

*Preparation: 11-3, 11-4*

*Second year, spring term*

*Three hours per week*

The course covers the principles and application of simple, compound, reversed, parabolic, and transition curves to railroad and highway location.

Methods of setting stakes for earthwork, the computation of cut and fill, and the use of tables and diagrams in solving the types of problem indicated above are studied in detail.

PROFESSOR ALVORD.

## SCHOOL OF ENGINEERING

### 12-2 RAILROAD SURVEYING, FIELD AND PRACTICE

*Course: I*

*Preparation: 12-1  
taken concurrently*

*Second year, spring term*

*Five hours per week*

The work follows closely the theories of course 12-1. It includes the layout in the field of various railroad curves; drafting room problems on location of railroads and highways from existing contour maps; and the reconnaissance and preliminary layout of a line of railroad about a mile long.

PROFESSOR ALVORD.

### 12-3 RAILROAD ENGINEERING

*Course: I*

*Preparation: 12-1, 12-2*

*Third year, fall term*

*Two hours per week*

The work is a continuation of course 12-1. Further study is devoted to the effect of haul and the use of the mass diagram in the determination of the final location. The economics of railroad location are considered, with a study of the effect of maximum grades, rise and fall, traffic, train resistance and tractive power on the design of the final location.

PROFESSOR ALVORD.

### 12-4 RAILROAD ENGINEERING, FIELD AND PRACTICE

*Course: I*

*Preparation: 12-3  
taken concurrently*

*Third year, fall term*

*Five hours per week*

Field work in connection with course 12-3. The final location of the railroad line is plotted, including vertical, horizontal, and transition curves. A mass diagram is drawn for the earth work, and final computation of cost is made. Part of the line is slope staked.

PROFESSOR ALVORD.

### 13-1 HYDRAULICS

*Courses: I, II, III, IV*

*Preparation: 031-I, 023-2, 21-I*

*Third year, summer term*

*Ten hours per week*

A study of both hydrostatics and hydrodynamics. The subjects considered are: the pressure on submerged areas together with their points of application; the laws governing the

## SYNOPSIS OF COURSES

flow of fluids through orifices, short tubes, nozzles, weirs, pipe lines, and open channels; and the dynamic pressure and work of water flowing over curved surfaces. A short study of stream flow measurements is also made.

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### 13-2 HYDRAULIC MOTORS

*Courses: II, III*

*Preparation: 13-1*

*Fourth year, fall term*

*Two hours per week*

Principles underlying the design of hydraulic turbines and motors. A study is also made of stream flow, storage, and other details relating to hydraulic installations.

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### 14-1 THEORY OF STRUCTURES

*Course: I*

*Preparation: 21-2*

*Third year, spring term*

*Three hours per week*

Class and drawing-room work in studying the loads, reactions, shears, and moments acting upon structures of various kinds, such as roofs and bridges. A thorough study is also made of the various functions of the influence line; the methods used to determine the position of moving loads to produce maximum shears and moments on bridges; and the design of beams.

PROFESSOR ALVORD.

### 14-2 STRUCTURAL DRAWING

*Course: I*

*Preparation: 21-2, 041-1*

*Third year, spring term*

*Three hours per week*

Drawing of standard sections of structural steel shapes and connections, and the preparation of drawings representing elementary structural details. The course is designed to familiarize the student with the designing and drawing of riveted connections, and the dimensioning and detailing of structural parts.

PROFESSOR NASH.

## SCHOOL OF ENGINEERING

### 14-3 ENGINEERING STRUCTURES

*Course: I*

*Preparation: 14-1, 14-2*

*Fourth year, both terms*

*Six hours per week*

The computation and design of structures of wood, steel, and masonry by analytical and graphical methods. The subjects considered are: plate girders, roof and bridge trusses of various types; such as simple trusses, bridge trusses with secondary web systems,—including Baltimore and Pettit trusses,—and trusses with multiple web systems, lateral and portal bracing, tranverse bents, viaduct towers, and cantilever bridges. A study is also made of the design of columns, tension members, pin and riveted truss joints, trestles of wood and steel, masonry dams, retaining walls, and arches. The student is also given training in the use of the standard handbooks in structural work. The object is to train the student thoroughly in the application of mechanics to the design of structure.

PROFESSOR NASH.

### 14-4 STRUCTURAL DESIGN

*Course: I*

*Preparation: 14-3  
taken concurrently*

*Fourth year, both terms*

*Six hours per week*

Designing and detailing of structures, using the theory learned in Course 14-3. Complete working drawings are ordinarily made of a single track plate girder railroad bridge, a riveted truss highway bridge, and a small concrete arch.

PROFESSOR GEE.

### 15-1 CONCRETE

*Courses: I, II*

*Preparation: 21-2*

*Fourth year, both terms*

*Two hours per week*

Concrete as a material of construction is studied in detail, and the principles of reinforced concrete design are learned. Computations and designs are made of flat slabs, T beams, columns, footings, retaining walls, and arches.

PROFESSOR ALVORD.

## SYNOPSIS OF COURSES

### 15-2 CONCRETE DESIGN

*Courses: I, II*

*Preparation: 15-1  
taken concurrently*

*Fourth year, both terms*

*Three hours per week*

Detailing and making of complete working drawings of the concrete structures designed in Course 15-1.

PROFESSOR ALVORD.

### 16-1 MATERIALS

*Courses: I, II\*, III\**

*Preparation: 21-2 or 21-3*

*Fourth year, fall term*

*Two hours per week*

A detailed study is made of the methods of manufacturing, properties, and uses of materials used in engineering work; such as iron and steel, lime, cement, concrete, brick, wood and stone. Methods of testing and strength of various materials used by the engineer are also taken up. Each student is required to prepare, and present to the class, a paper on some subject of especial importance, which is assigned by the instructor.

MR. STEARNS.

\*Third year, second term.

### 16-2 TESTING MATERIALS LABORATORY

*Course: I*

*Preparation: 21-2*

*Fourth year, spring term*

*Two hours per week*

The work is done by the students and includes tests to determine the elongation, reduction of areas, modulus of elasticity, yield point, ultimate compressive strength of metals, such as steel, cast iron, copper and brass; tensile and compressive tests on timber and concrete; tests to determine the deflection, modulus of elasticity, elastic limit, and ultimate transverse strength of steel and wooden beams, subject to transverse loads. Tests are also made on cement mortars to determine the strength of cubes and briquettes at different ages.

PROFESSOR ALVORD.

## SCHOOL OF ENGINEERING

### 16-3 FOUNDATIONS

*Course: I*

*Preparation: 14-1, 16-1  
taken concurrently*

*Fourth year, fall term*

*Two hours per week*

The subjects treated are pile formations—including those of timber and concrete—sheet piles, coffer-dams, box and open caissons, pneumatic caissons, pier foundations in open wells, bridge piers, and abutments.

PROFESSOR GEE.

### 17-1 HIGHWAY ENGINEERING

*Course: I*

*Preparation: 11-2*

*Fourth year, spring term*

*Two hours per week*

The location, construction, and maintenance of roads, street design, and street drainage; sidewalks; pavement foundations; and the construction, cost and maintenance of the various kinds of roads and pavements, including asphalt, brick, stone-block, wood-block, macadam (both water bound and bituminous), bituminous concrete, hydraulic cement concrete, gravel, and earth. Special consideration is given to the modern concrete road.

PROFESSOR GEE.

### 21-1 APPLIED MECHANICS

*Courses: I, II, III, IV*

*Preparation: 022-1, 031-1*

*Second year, both terms*

*Three hours per week*

The topics covered are: statics, forces in equilibrium, parallel forces, stresses in frames, forces in three dimensions, center of gravity, moment of inertia, radius of gyration; kinetics, centrifugal force, translation and rotation combined, percussion, friction of belting. The student is required to solve a large number of problems, and to pass examinations at frequent intervals. It is felt that the student should retain a considerable body of facts about this subject in his mind after graduation; therefore a thorough groundwork of theory is covered.

PROFESSOR BENEDICT.

## SYNOPSIS OF COURSES

### 21-2 STRENGTH OF MATERIALS

*Courses: I, II*

*Preparation: 023-2, 21-1*

*Third year, both terms*

*Three hours per week*

The topics covered are: the theory and experimental basis of tension, compression, shear, resilience, modulus of elasticity, bending stresses, the design of beams, moment and shear diagrams, use of tables of standard steel shapes, longitudinal shear and deflection in beams, combined stresses, beams with three supports, columns, the strength of shafts and springs, and principal stresses. The basis of the course is a continuous series of practical problems.

PROFESSOR BENEDICT.

### 21-3 STRENGTH OF MATERIALS

*Courses: III, IV*

*Preparation: 023-2, 21-1*

*Third year, fall term*

*Three hours per week*

Similar to course 21-2 but more limited in time. The topics omitted are columns, principal stresses, and longitudinal shear and deflection in beams.

PROFESSOR BENEDICT.

### 22-1 GRAPHICAL ANALYSIS

*Course: II*

*Preparation: 042-4, 044-3, 21-1*

*Third year, fall term*

*Six hours per week*

Many problems which may readily be solved by graphical methods are included here. Valve gear problems are solved by the use of the various diagrams. The kinematical features of various machines are studied by means of velocity and acceleration diagrams.

MR. FERRETTI.

### 22-2 ELEMENTARY MACHINE DESIGN

*Course: II*

*Preparation: 21-2*

*taken concurrently*

*Third year, spring term*

*Six hours per week*

Simple problems in design embodying the principles studied in the courses in Mechanism 044-2, 044-3, and Strength of Materials, 21-2. The earlier problems are concerned with de-

## SCHOOL OF ENGINEERING

signs to obtain desired motions, together with the use of some of the simpler machine details such as bolts, keys, pins, etc., while the later problems involve the calculation of simple stresses and the design for strength.

MR. FERRETTI.

### 22-3 MACHINE DESIGN

*Course: II*

*Preparation: 22-2*

*Fourth year, both terms*

*Six hours per week*

Practice is given the student in the application of theoretical principles previously studied, and at the same time he becomes familiar with the many practical details which must be considered in design work. The problems taken up in the early part of the course are of a static nature, while the later problems involve dynamical stresses. The design of some type of pressure vessel, such as a tank or a boiler, constitutes the first problem, the stresses for such a design being known with a great degree of certainty, and the materials of construction very reliable. The other problems of the course vary from year to year, but the following are typical of the designs taken up: arbor press, hydraulic flanging clamp, crane, air compressor, punch and shear, stone-crusher, etc.

In each design the constructive details are carefully considered, with special attention to methods of manufacture, provision for wear, lubrication, etc. The work is based on rational rather than empirical methods, the student being required to make all calculations for determining the sizes of the various parts and all necessary working drawings

MR. FERRETTI.

### 23-1 HEAT ENGINEERING

*Courses: II, III*

*Preparation: 023-2,*

*Third year, both terms*

*Three hours per week*

The fundamental principles underlying the subject of thermodynamics. A study is made of the following topics: the properties of perfect gases, saturated and super-heated vapors, air and steam cycles, and the flow of fluids through nozzles, and pipe-lines, and the calculations of an air compressor.

## SYNOPSIS OF COURSES

In the second half-year the principles of thermodynamics are applied to the various parts of the modern steam power plant. This includes a study of boilers, fuels and combustion, flue gas analysis, feed-water heaters, chimneys, steam engines, condensers, cooling towers, gas power, steam turbines, and also the methods of testing power plant equipment.

MR. FERRETTI.

### 23-2 ENGINEERING LABORATORY

*Courses: II, III*

*Preparation: 13-1, 23-1*

*Fourth year, fall term*

*Two hours per week*

Exercises and tests upon the various forms of appliances in use in the power plant, such as:

1. Gauge test and calibration.
2. Slide valve setting.
3. Corliss valve setting.
4. Testing quality of steam by steam calorimeter.
5. Determine flow of steam through an orifice.
6. Steam engine indicator practice.
7. Test of a simple steam engine.
8. Test of a compound steam engine.
9. Study of a steam driven air compressor.
10. Test of a steam driven air compressor.
11. Series of tests on a Pelton water wheel.

MESSRS. EAMES AND STEARNS.

### 23-3 HEAT ENGINEERING

*Courses: I, IV*

*Preparation: 023-2, 032-3, 21-1*

*Third year, spring term*

*Three hours per week*

The subject matter of thermodynamics is presented to the students of civil and chemical engineering to meet their especial needs.

MR. FERRETTI.

## SCHOOL OF ENGINEERING

### 23-5 HEAT ENGINEERING

*Course: II*

*Preparation: 23-1, 24-3*

*Fourth year, fall term*

*Two hours per week*

A continuation of Course 23-1. Among the subjects considered are the compression and absorption systems of refrigeration, Hirn's analysis of steam engine losses, and the theory of vapor mixtures.

MR. FERRETTI.

### 24-1 PRODUCTION ENGINEERING

*Course: II*

*Preparation: — —*

*First year, fall term*

*Two hours per week*

A descriptive course intended to acquaint the student with the organization, methods, and equipment used in industrial plants engaged in quantity production. For purposes of discussion the plant is divided into its various units: such as general offices, drafting-room, pattern-shop, foundry, machine-shop, erecting shop, testing-room, etc. The mechanical equipment, filing systems, cost-keeping systems, "follow-up" cards, etc., are described, and representative examples are shown.

PROFESSOR SWETT.

### 24-2 PRODUCTION ENGINEERING

*Course: II*

*Preparation: 24-1*

*First year, spring term*

*Two hours per week*

A continuation of course 24-1.

PROFESSOR SWETT.

### 24-3 POWER PLANT EQUIPMENT

*Course: II*

*Preparation: 23-1  
taken concurrently*

*Third year, fall term*

*Two hours per week*

Largely a description of the many appliances used in modern power plants. A discussion of boilers and boiler accessories, ash and coal handling systems, the various types of engines—gas engines, and turbines—with their valve gears and governing devices, condensers, feed-water heaters, pumps, etc.

MR. STEARNS.

## SYNOPSIS OF COURSES

### 24-4 JOURNALS AND REPORTS

*Course: II*

*Preparation: 22-2, 23-1*

*Fourth year, fall term*

*One hour per week*

Designed to acquaint the student with general engineering literature and to enable him to read intelligently discussions upon Mechanical Engineering Practice. The student has three hours of collateral reading per week in standard engineering publications, and the material gathered is discussed in class.

MR. STEARNS.

### 24-5 JOURNALS AND REPORTS

*Course: II*

*Preparation: 22-2, 23-1*

*Fourth year, spring term*

*One hour per week*

Reading and discussion as in Course 24-4, but distinct from it.

MR. STEARNS.

### 24-6 STANDARD ENGINEERING PRODUCTS AND PROCESSES

*Courses: II, III*

*Preparation: 16-1*

*Fourth year, spring term*

*Two hours per week*

Intended to familiarize the student with the commercial names and sizes of engineering products: such as, bar and plate stock, shafting, tubing, pipes, valves, bearings and hangers, belts, pulleys, etc. A discussion of such manufacturing processes as extrusion, broaching, press work, electric and oxy-acetylene welding, cold and hot rolling and drawing, etc., is included.

PROFESSOR SWETT.

### 25-1 INDUSTRIAL PLANTS

*Course: II*

*Preparation: 21-2, 23-1, 24-3*

*Fourth year, fall term*

*Three hours per week*

*spring term*

*Four hours per week*

The principles involved in the erection, installation, and management of an industrial plant. A description of the different types of structures, with consideration of such details

## SCHOOL OF ENGINEERING

as foundations, walls, columns, floors, windows, etc., is followed by a discussion of the installation of the power plant and machinery. Principles of illumination, fire-prevention, heating and ventilation, routing of materials, and the organization and management of a plant are taken up. A design problem is given in connection with the course.

MR. STEARNS.

### 30-1 ELEMENTS OF ELECTRICITY

*Courses: I, II, IV*

*Preparation: 022-I, 031-I*

*Second year, both terms*

*Two hours per week*

The foundation for subsequent electrical engineering work for students of Civil, Mechanical, and Chemical Engineering. Emphasis is laid on the fundamental principles, and the subject is developed by elaborating these principles through numerical applications. The topics discussed are, briefly: magnets and magnetism, electrical resistance and Ohm's law, electric work and power, series and parallel circuits, electromagnetism, electromagnetic induction, magnetic properties of iron, electrolysis and batteries, alternating currents and voltages, inductance, capacitance, and circuits containing resistance, inductance, and capacitance.

PROFESSOR DURKEE.

### 30-3 APPLIED ELECTRICITY

*Courses: I, II, IV*

*Preparation: 30-I*

*Third year, both terms*

*Two hours per week*

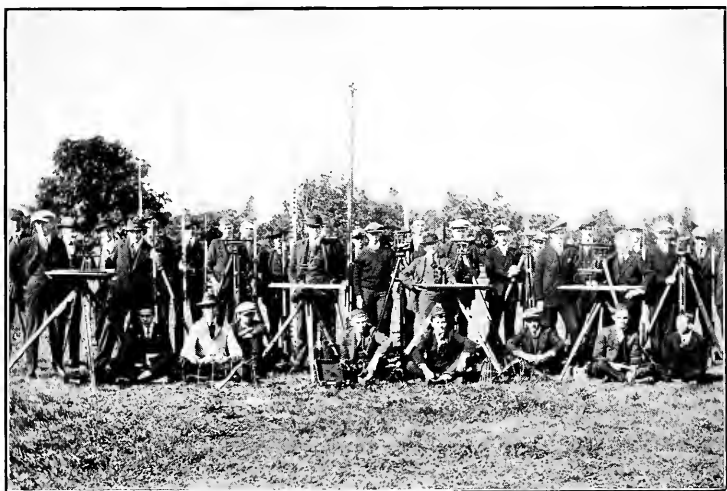
The object is to fit the student to handle intelligently electrical problems that are likely to come up in connection with his chosen field. The course varies somewhat in content, depending upon the particular branch of engineering which most of the students in the class are studying. In any case, the first term is devoted to a consideration of various direct-current machines and appliances; their characteristics and applications. In the second term alternating-current apparatus is treated in a similar manner.

PROFESSOR DURKEE.

# Civil Engineering Students

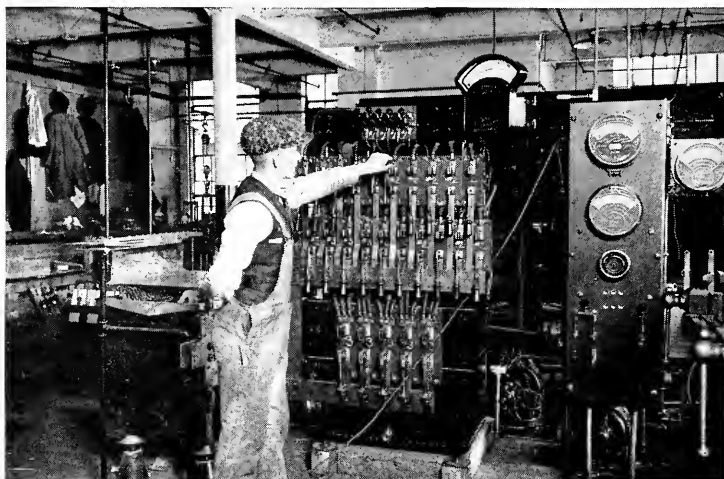


Making a Plane Table Survey  
Class in Surveying Fieldwork



Class in Surveying Fieldwork  
Northeastern College

# Electrical Engineering Students



Testing a 10,000 Ampere Storage Battery Control Panel  
Condit Electrical Mfg. Co.



Assembling Vacuum Tubes  
L. E. Knott Apparatus Company

## SYNOPSIS OF COURSES

### 30-4 APPLIED ELECTRICITY LABORATORY

*Courses: I, II, IV*

*Preparation: 30-3*

*taken concurrently*

*Third year, both terms*

*Three hours per week*

The characteristics and operation of direct and alternating current machinery, discussed in Course 30-3. The experiments deal with the following: resistance measurement, speed control direct-current motors; voltage control of generators; voltage regulation of direct-current generators; speed regulation of direct-current motors; brake tests of various types of direct and alternating-current motors; measurement of losses and the calculating of the efficiency of motors and generators; alternating current circuits containing resistance, inductance, and capacitance; determination of the characteristics of transformers; various polyphase connections; regulation of alternators; synchronous motor, rotary converter, and induction motor characteristics. A written report is required on each experiment, and especial care is exercised that such reports be correct in manner and in form.

PROFESSOR DURKEE,

MR. PORTER.

### 31-1 ELEMENTS OF ELECTRICAL ENGINEERING

*Course: III*

*Preparation: —*

*First year, fall term*

*Two hours per week*

A descriptive discussion of the fundamental principles of electricity, combined with an outline of their application in the art. The principal aim is to familiarize the student as soon as possible with those matters with which it is important he should be acquainted, in order that he may from the beginning obtain the most possible from his Engineering Practice.

PROFESSOR SMITH.

### 32-1 ELECTRICAL ENGINEERING

*Course: III*

*Preparation: 31-I, 40-I*

*First year, spring term*

*Two hours per week*

A study in detail of the electric current, electromotive force and resistance, electrical work and power, electrical circuits, Kirchoff's laws, primary and secondary batteries, magnetism,

## SCHOOL OF ENGINEERING

electromagnetism, electromagnetic induction, self and mutual inductance, electrostatics, energy stored in the electromagnetic and electrostatic field. The practical units of measurement are discussed, as the several quantities to which they apply are successively reached.

MR. PORTER.

### 32-2 ELECTRICAL LABORATORY

*Course: III*

*Preparation: 32-1  
taken concurrently*

*First year, spring term*

*Three hours per week*

Experiments selected and arranged to teach the use of the more common electrical measuring instruments and to illustrate and enforce the principles developed in Course 31-1.

MR. PORTER.

### 32-3 ELECTRICAL ENGINEERING

*Course: III*

*Preparation: 022-1, 031-1, 32-1*

*Second year, fall term*

*Three hours per week*

A careful, though more or less descriptive, discussion of the dynamo in general, and its uses both as generator and motor, together with a thorough discussion of the magnetic properties of iron and the magnetic circuit, and a careful consideration of the single energy transient in inductive circuits, followed by a thorough study of the direct current machine—armature windings, armature reactions and their compensation, commutation, generator and motor ratings.

PROFESSOR SMITH.

### 32-4 ELECTRICAL LABORATORY

*Course: III*

*Preparation: 32-3, 32-5  
taken concurrently*

*Second year, both terms*

*Three hours per week*

A carefully selected series of experiments intended to exemplify qualitatively, and in the clearest manner, the principles developed in the parallel lecture courses, 32-3, and 32-5. It includes a series of about twenty experiments, of which the following may be mentioned as illustrative of the type of work:

The starting of a shunt motor, and starting devices.

## SYNOPSIS OF COURSES

The speed, field and voltage relations in a separately excited machine.

The heat test of a generator.

The characteristic curves of generators.

The parallel operation of shunt and compound generators.

The three wire balancer set.

The speed and torque curves of the series motor.

Satisfactory completion of fifteen experiments is the minimum acceptable amount of work.

Since the purpose of the course is in part to develop correct methods of work, it is intended that the whole of the preparatory work, as well as the working up of the data obtained, shall be done in the laboratory under supervision of the instructor, so far as necessary.

MR. PORTER.

### 32-5 ELECTRICAL ENGINEERING

*Course: III*

*Preparation: 32-3*

*Second year, spring term*

*Four hours per week*

Divided into two parts: first, a discussion of the uses and operation of the machinery discussed in 32-1, illustrative of which may be mentioned: parallel operation, three wire systems and machines, boosters and balancers, special motor applications and control and similar subjects; second, a study of the methods and principles involved in the testing for efficiency and performance of the machinery studied.

Much emphasis is placed upon the working of problems, a special weekly period being set aside for this, and about one hundred problems are worked in the class-room.

PROFESSOR SMITH.

### 32-6 ELECTRICAL LABORATORY

*Course: III*

*Preparation: 32-4, and 32-7 and 33-1  
taken concurrently*

*Third year, both terms*

*Six hours per week*

A series of experiments involving the testing of machines; together with experiments intended to elucidate practically the principles developed in the parallel course on alternating currents, 32-7, and also to train the student in the use of the special

## SCHOOL OF ENGINEERING

types of instruments which he will later use in the laboratory work upon alternating current machinery.

Illustrative experiments are:

Stray power tests, Prony brake tests, retardation tests, pumping back tests, regulation tests, heat runs, analysis of losses, etc.

Study of A-C series and parallel circuits, resonant conditions, effect of frequency change on circuit constants, parallel operation of A-C machines, synchronizing and changing load, power factor measurements, power measurement in polyphase circuits, etc.

As the course progresses, the student is thrown more and more upon his own resources; a desired result is stated to him, and he is left to plan out his own methods, settle upon the apparatus needed, solve his precision requirements, calibrate the instruments, if necessary, and finally turn in a detailed report covering all phases of the work from its inception.

PROFESSOR SMITH,

MR. PORTER.

### 32-7 ELECTRICAL ENGINEERING

*Course: III*

*Preparation: 023-2, 032-3, 32-5*

*Third year, both terms*

*Four hours per week*

Lectures, recitations, and problem work upon the electromagnetic and electrostatic fields, variable, and alternating currents. Among the subjects covered are: solution of linear differential equations of the first and second degree with constant coefficients leading to the general equation of current in any circuit, transients and the establishment of the steady state, consideration of the steady state when the electromotive force follows the sine law, harmonic alternating currents complex quantity, vector representation, topographic representation, symbolic representation. Application of the principles developed to all possible combinations of resistance, inductive and condensive reactances in both single and polyphase circuits. The course is emphatically mathematical, involving the use of both Fourier series and hyperbolic functions, so that thorough comprehension of the preparatory mathematical subjects cannot be too strongly insisted upon. About two hundred problems are worked in class during the year.

PROFESSOR SMITH.

## SYNOPSIS OF COURSES

### 32-8 ELECTRICAL LABORATORY

*Course: III*

*Preparation: 32-7, 32-9  
taken concurrently*

*Fourth year, both terms*

*Six hours per week*

Laboratory course to accompany Course 32-9 in alternating-current machinery. The work includes tests on the heating, efficiency, and determination of the characteristics of the various types of alternating-current machinery, such as transformers, generators, and motors. A detailed preliminary study is made of each assigned experiment, involving the theoretical principles, the method of procedure to obtain the required results, and the way in which the results should be worked up. This is embodied in a preliminary report. The student then does the necessary laboratory work to obtain the required data; and finally works up the whole into a detailed final report. The assistance given by the instructor is reduced to a minimum, the initiative and resourcefulness of the student being depended on to the greatest extent.

PROFESSOR DURKEE,

MR. PORTER.

### 32-9 ELECTRICAL ENGINEERING

*Course: III*

*Preparation: 32-7*

*Fourth year, both terms*

*Four hours per week*

A careful, thorough, and detailed discussion of the construction, theory, operating characteristics, and testing of the various types of alternating current machinery. The first half of the course is equally divided between the transformer and the synchronous generator. In the second half of the course synchronous motors, parallel operation of alternators, synchronous converters, polyphase induction motors, the induction generator, single phase induction motors, and commutating alternating-current motors are taken up. One two-hour period a week is spent in the solution of numerical problems.

PROFESSOR DURKEE.

## SCHOOL OF ENGINEERING

### 33-1 ELECTRICAL MEASUREMENTS

*Course: III*

*Preparation: 023-2, 033-1, 32-5*

*Third year, both terms*

*Two hours per week*

A brief discussion of measurement in general and electrical measurements in particular, in which a review of the electrical units and their definitions has a part. Resistance devices, galvanometers, ammeters, and voltmeters are next discussed, the treatment of other instruments being taken up later in connection with their uses. This is followed by a detailed discussion of the methods of measuring the various electrical quantities—resistance, resistivity, conductivity, current, electromotive force, capacitance, inductance, magnetic induction, permeability, hysteresis loss, energy, and power. The student is given a thorough treatment of the construction, theory of operation, method of use, sources of error, etc., of the types of measuring instruments used in commercial work and in the standardizing laboratory.

PROFESSOR DURKEE.

### 33-2 ELECTRICAL MEASUREMENTS LABORATORY

*Course: III*

*Preparation: 33-1  
taken concurrently*

*Third year, both terms*

*Three hours per week*

A series of experiments emphasizing the principles developed in Course 33-1. The student becomes familiar with the use of the standard apparatus in use in testing laboratories. Particular stress is laid on the correct use of the apparatus, and precision discussions are required throughout.

The experiments cover such matters as the measurement of resistance by various methods, resistivity, conductivity, electromotive force, current inductance, capacitance, magnetic induction, magnetizing force, hysteresis loss, etc. Work is given in calibrating ammeters, voltmeters and watt-hour meters, in cable testing, magnetic testing, wave form determination, and the use of special apparatus such as the Kelvin bridge, Carey Foster bridge, potentiometer, etc.

PROFESSOR DURKEE.

## SYNOPSIS OF COURSES

### 34-1 ELECTRICAL ENGINEERING

*Course: III*

*Preparation: 13-1, 13-2, taken concurrently, 23-1, 32-7, 32-9, taken concurrently*

*Fourth year, both terms*

*Four hours per week*

A detailed study of the central station, both steam driven and hydroelectric, equally careful attention being given to the engineering and economic details, the influence of the various appliances upon the cost of power being kept constantly in view.

Following this comes a careful study of the high tension transmission line, the potentials used, spacing of conductors, line characteristics, losses, inductive effects upon neighboring circuits, quarterwave transmission, surges, etc.

After this is considered the sub-station and equipment, and then follows a full discussion of distribution systems and the utilization of electrical power, especial attention being given to railway operation, and the matter of out-door and interior illumination. The course closes with a brief discussion of the Public Utility in its relations to the community served.

PROFESSOR SMITH.

### 35-1 ADVANCED ELECTRICITY

*Course: III*

*Preparation: 32-7*

*Fourth year, both terms*

*Two hours per week*

The first term: a full descriptive discussion of modern electrical theory. Beginning with the state of electrical science in the time of Franklin, the development of the science is traced through the work of Faraday, Maxwell, Hertz, and Kelvin on the one hand; of Weber, Crookes, J. J. Thomson, Millikan, and others on the other. The subjects of metallic, electrolytic, and gaseous conduction are discussed, together with ionization, the theories of electromagnetic mass, and the electrical constitution of matter. The course closes with an elementary discussion of the principles of relativity.

PROFESSOR SMITH.

## SCHOOL OF ENGINEERING

### 40-1 INORGANIC CHEMISTRY

*Courses: I\*, II, III*

*Preparation: — —*

*First year, fall term*

*Four hours per week*

A course in inorganic chemistry designed to meet the needs of students in non-chemical courses. It includes a brief discussion of the general principles of chemistry as applied to engineering, with the idea of illustrating the applications of chemistry to special lines of engineering work.

MESSRS. STRAHAN AND BAKER

\*Third year, first term.

### 41-1 INORGANIC CHEMISTRY

*Course: IV*

*Preparation: — —*

*First year, both terms*

*Four hours per week*

The fundamental principles of the science are taught by means of experimental lectures. Topics of a broad general character are taken up in the first part of the course, in connection with the descriptive chemistry of the non-metallic elements, followed later by more specialized work in connection with the elements. Recitations will include a short written test on the two lectures of the week. Special attention is given to chemical calculations based on practical application.

MR. STRAHAN.

### 41-2 INORGANIC CHEMICAL LABORATORY

*Course: IV*

*Preparation: 4I-I  
taken concurrently*

*First year, both terms*

*Five hours per week*

The object of the course is to cultivate scientific attitude and habit of thought on the part of the student, and to increase his power of acquiring knowledge, whether it be from book, lecture, or from experiment. The experiments are planned to illustrate the topics which have been discussed in the lecture room. Careful manipulations, thoroughness in observation, accuracy in arriving at conclusions are required of each student. In this, as in all subsequent laboratory work, neat and satisfactory notes will be considered an essential part of the work.

MR. STRAHAN.

## SYNOPSIS OF COURSES

### 42-1 QUALITATIVE ANALYSIS

*Course: IV*

*Preparation: 41-1, 41-2*

*Second year, both terms*

*Two hours per week*

The course is designed not merely to consider the procedures used in the detection of the common elements, but to deal in a much broader way with the principles involved in chemical analysis and to broaden the student's knowledge of inorganic chemistry, especially the chemistry of the metallic elements. In the latter part of the course questions involving the analysis of unusual mixtures will be discussed with especial emphasis on the interpretation of analytical results.

PROFESSOR WILLIAMS.

### 42-2 QUALITATIVE ANALYSIS LABORATORY

*Course: IV*

*Preparation: 42-1*

*taken concurrently*

*Second year, both terms*

*Five hours per week*

After a series of preliminary experiments illustrating principles and giving opportunity for practice in writing equations, the analysis of unknown substances is undertaken, beginning with solutions and simple salts, and later analyzing minerals, pigments, slags, alloys and various commercial products, such as boiler compounds, cleaning powders, glass, enamels, and similar inorganic substances.

MR. STRAHAN.

### 43-1 QUANTITATIVE ANALYSIS

*Course: IV*

*Preparation: 42-1, 42-2*

*Third year, fall term*

*Two hours per week*

The general principles of quantitative analysis. Half of the time is devoted to the consideration of typical methods in gravimetric analysis: such as, the determination of chloride in salt, the analysis of ferrous sulphate for iron and the sulphate, the complete analysis of brass, and other analyses involving general principles of procedure. The other half of the time is devoted to the methods of volumetric analysis as illustrated in the use of acid and alkali determinations, oxidation methods involving bichromate, permanganate and iodine, and the methods of volu-

## SCHOOL OF ENGINEERING

metric precipitation. Special attention is given to chemical calculations, and the solution of numerous analytical problems is one of the essential features of the course.

PROFESSOR WILLIAMS.

### 43-2 QUANTITATIVE ANALYSIS LABORATORY

*Course: IV*

*Preparation: 43-1  
taken simultaneously*

*Third year, fall term*

*Five hours per week*

Analytical practice illustrating the methods discussed in Course 43-1. The calibration of burettes, the use and care of analytical balances, and a limited number of typical gravimetric and volumetric analyses are included in the course, in which great stress is laid on the accuracy, care, and integrity necessary for successful quantitative work.

MR. BAKER.

### 44-1 TECHNICAL ANALYSIS

*Course: IV*

*Preparation: 43-1, 43-2*

*Third year, spring term*

*Two hours per week*

A continuation of Course 43-1 dealing more specifically with the methods of testing used in connection with industrial operations. It will include the rapid methods for steel, the analysis of boiler waters, gases, fuels, oils, paints, varnishes, and similar substances.

PROFESSOR WILLIAMS.

### 44-2 TECHNICAL ANALYSIS LABORATORY

*Course: IV*

*Preparation: 44-1  
taken concurrently*

*Third year, spring term*

*Five hours per week*

Designed to illustrate by a limited number of analyses the technical methods of quantitative analysis. Problems will be assigned individually, depending on the student's future plans or his inclination, and will be selected from the fields of steel analysis, gas and fuel analysis—including calorific testing, water analysis. Time is devoted to the study of pigments, soaps, or in general in the analysis of that class of materials in which the student is most interested.

MR. BAKER.

## SYNOPSIS OF COURSES

### 45-1 ORGANIC CHEMISTRY

*Course: IV*

*Preparation: 43-1 and 43-2  
taken concurrently*

*Third year, both terms*

*Three hours per week*

The underlying principles and theories of organic chemistry, the methods of preparation, and characteristic reactions of carbon compounds. The important organic compounds will be considered in detail; because they serve as the most convenient examples for illustrating fundamental principles which elucidate the chemical character of substances which are of practical importance.

MR. STRAHAN.

### 45-2 ORGANIC CHEMISTRY LABORATORY

*Course: IV*

*Preparation: 45-1  
taken concurrently*

*Third year, both terms*

*Five hours per week*

The operations, apparatus, and the laboratory technique involved in organic work: such as, fractional distillation, extraction, crystallization, steam distillation, determinations of melting points, boiling points, and the like. It deals also with general methods of preparation, such as etherification, saponification, sulphonation, diazotization, etc. The student will prepare a number of compounds—including nitro-benzene, aniline, ethers, phenols, and other typical organic substances.

MR. BAKER.

### 45-3 ORGANIC CHEMISTRY

*Course: IV*

*Preparation: 45-1*

*Fourth year, both terms*

*Two hours per week*

A review of Course 45-1 is given, but the subject is studied from a more mature point of view. Emphasis is placed on the effect of the nature of organic radicals on the properties of the compounds containing them, the effect of unsaturation, and the influence of structure and substituents on the activity of radicals.

Industrially important compounds are treated more at length than those of a purely scientific use and of interest to the advanced students only.

## SCHOOL OF ENGINEERING

During the latter part of the course outside reading will be assigned in the scientific journals, followed by reports and discussions.

MR. RADASCH.

### 45-4 ORGANIC CHEMISTRY LABORATORY

*Course: IV*

*Preparation: 45-3  
taken concurrently*

*Fourth year, both terms*

*Five hours per week*

Preparations and reactions of typical organic substances—including the methods of separation and identification of simple mixtures. The instruction also includes a study of the qualitative tests for the important elements occurring in organic compounds, and quantitative determinations of carbon, hydrogen, and nitrogen.

MESSRS. STRAHAN AND BAKER.

### 46-1 CHEMICAL ENGINEERING

*Course: IV*

*Preparation: 13-1, 23-3, 43-1, 48-1  
taken concurrently*

*Fourth year, both terms*

*Three hours per week*

The principles underlying the mechanical operations involved in chemical industries, together with a study of the apparatus used to perform these operations, are discussed in the class room and are further illustrated by the solution of typical problems of a chemical engineering nature. The study of stoichiometrical relations as applied to chemical industry, the flow of heat, crushing and grinding, separation, filtration, evaporation, distillation, and the flow of fluids are among the subjects considered at length.

MR. RADASCH.

### 47-1 INDUSTRIAL CHEMISTRY

*Course: IV*

*Preparation: 44-1, 45-2*

*Fourth year, both terms*

*Three hours per week*

The more important industrial processes are studied with a view to the general chemistry involved and to the various types of apparatus necessary to carry out the chemical reactions. The student is given a broad survey of the field of chemical industry and a knowledge of the relationships of the different

## SYNOPSIS OF COURSES

industries to one another. The industries studied include the production of acids, alkali, fertilizers, glass, pigments, cements, soap, explosives, paper, petroleum, illuminating gas, and other general chemicals.

MR. RADASCH.

### 47-2 INDUSTRIAL CHEMICAL LABORATORY

*Course: IV*

*Preparation: 47-I  
taken concurrently*

*Fourth year, fall term*

*Eight hours per week*

The quantitative study of the preparation and purification of a small number of chemical products, selected as types of reactions of industrial importance. The processes employed are carefully controlled, and the final products are analyzed to determine their purity. When the work is completed, a careful detailed report of each process is made and discussed in class.

MR. RADASCH.

### 48-1 PHYSICAL CHEMISTRY

*Course: IV*

*Preparation: 41-I, 42-I, 43-I*

*Fourth year, both terms*

*Four hours per week*

The more important principles of Theoretical Chemistry are treated with great thoroughness and are illustrated by applying them to a large variety of problems. The principles are further illustrated by lecture experiments. During the course the following subjects are considered: pressure volume relations of gases and solutions, derivation of molecular and atomic weights, conductivity of solutions, ionic theory and mass action law, effect of temperature on chemical equilibrium, the laws of energy with reference to the production of heat and work, the electro-motive force of voltaic cells, and other electro-chemical topics.

DR. PARSONS.

### 50-1 ENGINEERING CONFERENCE

*Courses: I, II, III, IV*

*Preparation: — —*

*Second, third and fourth  
years, both terms*

*One hour per week*

The connecting link between the industry and the class room. The second, third, and fourth year men of each course meet in

## SCHOOL OF ENGINEERING

four separate groups for four of the five meetings, during each period. Each student in turn gives a fifteen minute to half hour talk on some particular phase of his own job. This talk then becomes the subject of discussion by the whole class and the problem is considered in as much detail as seems best to the instructor.

For the fifth meeting of each period all courses meet together in Bates Hall and hear some speaker on a technical subject of live interest to all engineering students.

It is in this course that the student receives his rating for the outside work. The general characteristic marks as turned in by the co-operating firm, the marks for the reports written each period while at work, and the marks for the individual talk, are averaged in due proportion to find the grade due the student for his Engineering Practice mark.

PROFESSORS NASH AND DURKEE,  
MESSRS. STEARNS AND STRAHAN.

### 51-1 THESIS

*Courses: I, II, III, IV*

*Preparation: Technical courses*

*Fourth year, both terms*

*One hour per week*

Each student in every course in order to become a candidate for the degree must present a thesis showing an original investigation in some branch of their course. Each student chooses a subject for his thesis after consultation with the head of his department.

This thesis is intended primarily to test the student's ability to do original work along technical lines. The problem undertaken may be in the nature of a research, an original design, a test, or a laboratory experiment provided that the work is done in a thorough business like manner and a well balanced report, including working drawings in the case of a design, is presented. While only one hour per week is scheduled for consultation with the instructor to direct the student's efforts along the proper channels the student should choose a subject of sufficient weight to require at least three hours of preparation per week during the first term and six hours per week during the second term of the senior year. More weight is given to

## SYNOPSIS OF COURSES

the manner in which the student attacks and carries through his thesis than to the actual results obtained, and for this reason the completed thesis must contain not only the complete description of the investigation and its results but also a general review of, or references to, the reading done in connection with the work. Students may work together on an important investigation but individual initiative is always encouraged.

All theses must be approved by the Dean before acceptance and are to be handed to him not later than the first day of the second term examination period. They must be submitted in form suitable for binding, being written on standard school thesis paper 8 inches by 10½ inches with a one inch margin on each side. Upon acceptance the thesis becomes the property of the school and is not to be printed or published without the consent of the Faculty.

### 90-1 PHYSICAL TRAINING

*Courses: I, II, III, IV*

*Preparation: — —*

*All terms*

*Two hours per week*

All students are required to take this course. Health, strength, and vitality do not come by chance, but by obedience to natural laws. It is very essential for the students to acquire good habits of life. The work in the gymnasium is of the body building type with plenty of competition. Regular classes in calisthenics are held under an able physical instructor.

Students who are members of the Varsity Squads in any of the major sports may be excused from Physical Training upon petition to the Faculty providing the petition is supported by the certification of the Athletic Coach and Physical Director. Upon petition of a student to be excused from Physical Training, owing to physical disability, favorable action will be taken by the Faculty only when said petition is accompanied by a physician's certificate, verifying the disability.

MR. SINNETT.

# SCHOOL OF ENGINEERING

## SUBJECTS OF INSTRUCTION

No.	SUBJECT	Course	Year
010-1	English .....	I, II, III, IV	1
020-1	College Algebra .....	I, II, III, IV	1
021-1	Trigonometry .....	I, II, III, IV	1
022-1	Analytic Geometry .....	I, II, III, IV	1
023-1	Calculus .....	I, II, III, IV	2
023-2	Calculus .....	I, II, III, IV	2
030-1	Physics Laboratory .....	I, II, III, IV	1
031-1	Physics .....	I, II, III, IV	1
031-2	Physics Laboratory .....	I, II, III, IV	2
032-1	Light .....	I, II, III, IV	2
032-2	Physics Laboratory .....	I, II, III, IV	2
032-3	Heat .....	I, II, III, IV	2
033-1	Precision of Measurements .....	II, III	2
041-1	Mechanical Drawing .....	I, II, III, IV	1
041-2	Mechanical Drawing .....	I, IV	1
041-3	Mechanical Drawing .....	II, III	1
042-1	Machine Drawing .....	I, IV	2
042-2	Machine Drawing .....	I, IV	2
042-3	Machine Drawing .....	II, III	2
042-4	Machine Drawing .....	II	2
043-1	Descriptive Geometry .....	I, II, III, IV	1
044-1	Mechanism .....	I, III, IV	2
044-2	Mechanism .....	II	2
044-3	Mechanism .....	II	2
051-1	Geology .....	I, II	3
061-1	Economics and Sociology .....	I, II, III, IV	1
062-1	Government .....	I, II, III, IV	2
063-1	History of Science .....	I, II, III, IV	3
064-1	German .....	IV	4
11-1	Surveying .....	I	1
11-2	Surveying Field and Practice .....	I	1
11-3	Surveying .....	I	2
11-4	Surveying Field and Practice .....	I	2
11-5	Surveying .....	II, III	3
12-1	Railroad Surveying .....	I	2
12-2	Railroad Surveying Field and Practice .....	I	2
12-3	Railroad Engineering .....	I	3
12-4	Railroad Engineering Field and Practice .....	I	3
13-1	Hydraulics .....	I, II, III, IV	3
13-2	Hydraulic Motors .....	II, III	4
14-1	Theory of Structures .....	I	3
14-2	Structural Drawing .....	I	3
14-3	Engineering Structures .....	I	4
14-4	Structural Design .....	I	4
15-1	Concrete .....	I, II	4
15-2	Concrete Design .....	I, II	4
16-1	Materials .....	I, II*, III*	4
16-2	Testing Materials Laboratory .....	I	4
16-3	Foundations .....	I	4
17-1	Highway Engineering .....	I	4
21-1	Applied Mechanics .....	I, II, III, IV	2
21-2	Strength of Materials .....	I, II	3
21-3	Strength of Materials .....	III, IV	3
22-1	Graphical Analysis .....	II	3
22-2	Elementary Machine Design .....	II	3
22-3	Machine Design .....	II	4

# SUBJECTS OF INSTRUCTION

No.	SUBJECT	Course	Year
23-1	Heat Engineering .....	II, III	3
23-2	Engineering Laboratory .....	II, III	4
23-3	Heat Engineering .....	I, IV	3
23-5	Heat Engineering .....	II	4
24-1	Production Engineering .....	II	1
24-2	Production Engineering .....	II	1
24-3	Power Plant Equipment .....	II	3
24-4	Journals and Reports .....	II	4
24-5	Journals and Reports .....	II	4
24-6	Standard Engineering Products and Processes ...	II, III	4
25-1	Industrial Plants .....	II	4
30-1	Elements of Electricity .....	I, II, IV	2
30-3	Applied Electricity .....	I, II, IV	3
30-4	Applied Electricity Laboratory .....	I, II, IV	3
31-1	Elements of Electrical Engineering .....	III	1
32-1	Electrical Engineering .....	III	1
32-2	Electrical Engineering Laboratory .....	III	1
32-3	Electrical Engineering .....	III	2
32-4	Electrical Engineering Laboratory .....	III	2
32-5	Electrical Engineering .....	III	2
32-6	Electrical Engineering Laboratory .....	III	3
32-7	Electrical Engineering .....	III	3
32-8	Electrical Engineering Laboratory .....	III	4
32-9	Electrical Engineering .....	III	4
33-1	Electrical Measurements .....	III	3
33-2	Electrical Measurements Laboratory .....	III	3
34-1	Electrical Engineering .....	III	4
35-1	Advanced Electricity .....	III	4
40-1	Inorganic Chemistry .....	I,* II, III	1
41-1	Inorganic Chemistry .....	IV	1
41-2	Inorganic Chemistry Laboratory .....	IV	1
42-1	Qualitative Analysis .....	IV	2
42-2	Qualitative Analysis Laboratory .....	IV	2
43-1	Quantitative Analysis .....	IV	3
43-2	Quantitative Analysis Laboratory .....	IV	3
44-1	Technical Analysis .....	IV	3
44-2	Technical Analysis Laboratory .....	IV	3
45-1	Organic Chemistry .....	IV	3
45-2	Organic Chemistry Laboratory .....	IV	3
45-3	Organic Chemistry .....	IV	4
45-4	Organic Chemistry Laboratory .....	IV	4
46-1	Chemical Engineering .....	IV	4
47-1	Industrial Chemistry .....	IV	4
47-2	Industrial Chemistry Laboratory .....	IV	4
48-1	Physical Chemistry .....	IV	4
50-1	Engineering Conference .....	I, II, III, IV	2, 3, 4
51-1	Thesis .....	I, II, III, IV	4
90-1	Physical Training .....	I, II, III, IV	1, 2, 3, 4

\*Third year

# SCHOOL OF ENGINEERING

## REGISTER OF STUDENTS

Enrolled During the School Year 1920-1921

NAME	COURSE	YEAR	HOME ADDRESS
Abramson, Samuel	Ch. E.	1921	Roxbury
Abromson, Harry P.	Ch. E.	1921	Cambridge
Abromson, Onne	Ch. E.	1921	Cambridge
Addison, Ernest H.	E. E.	1924	Byfield
Aimo, Karl H.	C. E.	1923	Allston
Albert, Samuel	E. E.	1921	Beverly
Alderman, Leon D.	M. E.	1924	Beverly
Allen, Charles R.	M. E.	1923	Pittsfield
Allen, Earle C.	C. E.	1922	Holbrook
Allen, Earle F.	E. E.	1923	Augusta, Me.
Almond, William H.	E. E.	1924	Fall River
Alves, John J.	M. E.	1922	Provincetown
American, Arsham P.	C. E.	1923	Boston
Ammidown, Theodore W.	M. E.	1924	Boston
Anderson, E. Allen	Ch. E.	1924	Norwood
Anderson, Henry G.	M. E.	1924	West Roxbury
Aquino, Serafin	Ch. E.	1924	San Juan, Porto Rico
Arata, Claude J.	E. E.	1923	Hallowell, Me.
Atkinson, Ralph L.	Ch. E.	1921	Dorchester
Augusta, Harold C.	E. E.	1924	Dorchester
Baader, Albert S.	E. E.	1924	Everett
Bader, Charles A.	M. E.	1924	Easthampton
Bailey, Arthur H.	M. E.	1924	Brookfield
Bailey, Louis M.	E. E.	1923	So. Duxbury
Bailey, Percy W.	E. E.	1922	Kingston
Baird, Charles O.	C. E.	1924	Lynn
Baker, Charles G.	E. E.	1923	Georgetown
Baker, Clifford D.	M. E.	1923	Beverly
Balcom, George M.	E. E.	1924	Natick
Ballou, George	C. E.	1922	Boston
Bamford, Joseph A.	C. E.	1924	Everett
Barber, Dana H.	M. E.	1924	Newton
Barker, Charles K.	E. E.	1923	Natick
Barney, Kenneth M.	E. E.	1924	Dorchester
Barrett, Roger N.	E. E.	1924	Marlboro
Barry, John J.	E. E.	1924	Salem
Bartlett, James H., Jr.	C. E.	1924	Quincy
Bearse, Richard C.	Ch. E.	1923	Springfield
Beattie, Robert	M. E.	1924	Everett
Becker, Abraham A.	Ch. E.	1923	Cambridge
Bennett, Lester L.	E. E.	1924	Everett
Benson, Raymond H.	M. E.	1924	Athol
Bentley, Stanley	E. E.	1924	Mattapan
Berlyn, Lewis	E. E.	1923	Salem
Bernier, Raymond E.	E. E.	1924	Springfield
Berry, George F.	C. E.	1923	Baldwinville

# REGISTER OF STUDENTS

NAME	COURSE	YEAR	HOME ADDRESS
Bessom, Ralph	M. E.	1922	Lynn
Betzen, Karl V.	M. E.	1924	Winthrop
Bigelow, Cecil H.	M. E.	1923	Monument Beach
Bigelow, Maurice H.	Ch. E.	1924	Concord
Bingham, Lloyd A.	E. E.	1924	Middlebury, Vt.
Blake, Howard J.	Ch. E.	1924	Boston
Bliss, Raymond	M. E.	1923	Winthrop
Bliss, Theodore B.	Ch. E.	1923	Jamaica Plain
Bluemer, Edwin F.	Ch. E.	1923	Brookfield
Boardman, Raymond E.	Ch. E.	1924	Natick
Bodemer, Philip E.	C. E.	1924	Cambridge
Boden, Arthur T.	E. E.	1923	Beverly
Boomhover, Roger P.	M. E.	1924	Salem
Bouchard, George H.	Ch. E.	1924	Salem
Bourne, Arthur E.	M. E.	1924	Melrose
Boyd, Ronald A.	E. E.	1924	Taunton
Boyd, Thomas P.	M. E.	1922	Chelsea
Bradbury, Raymond	M. E.	1922	New Britain, Conn.
Bradford, Cecil B.	M. E.	1924	Plainfield, Conn.
Bradstreet, Raymond	Ch. E.	1922	Middleton
Brainard, Francis D.	C. E.	1924	Danvers
Brask, Henry	C. E.	1923	Attleboro
Breen, John J.	E. E.	1924	Rockport
Brennan, James F.	M. E.	1923	Salem
Britchky, Hyman	Ch. E.	1922	Foxboro
Brooks, Curtis C.	M. E.	1924	No. Hanover
Brooks, Francis W.	M. E.	1922	Belmont
Brooks, John S.	M. E.	1924	No. Hanover
Brown, Alfred	Ch. E.	1924	Everett
Brown, Bernard C.	C. E.	1924	Georgetown
Brown, Martin	M. E.	1921	Boston
Brown, Murray	E. E.	1924	Lynn
Brown, Ralph E.	E. E.	1922	Rockland
Brown, Richard B.	E. E.	1922	Plymouth
Buckler, John A.	E. E.	1924	Springfield
Burbeck, Stanley O.	M. E.	1924	Woodsville, N. H.
Burke, George L.	C. E.	1924	Norwood
Bushnell, Laverne	M. E.	1923	Dedham
Butterworth, Percy T.	E. E.	1923	Forest Hills
Caldwell, Charles W.	Ch. E.	1924	Jamaica Plain
Callanan, Herbert A.	M. E.	1922	Danvers
Callanan, Walter L.	E. E.	1924	Danvers
Campbell, Oscar J.	M. E.	1924	Hudson, N. H.
Canney, True D.	E. E.	1924	Melrose
Carl, James W.	M. E.	1922	Cambridge
Carlsen, Fred H.	E. E.	1922	Gloucester
Carpenter, George D.	C. E.	1924	Cambridge
Carr, Thomas F.	C. E.	1924	Marlboro
Carroll, Francis R.	Ch. E.	1923	Cambridge
Carter, Curtis S., Jr.	E. E.	1921	Haverhill
Caswell, Orville G.	M. E.	1923	East Lynn
Cates, Lewis G.	C. E.	1922	Boston
Chadwick, Earle R.	E. E.	1924	Blandford

# SCHOOL OF ENGINEERING

NAME	COURSE	YEAR	HOME ADDRESS
Chandler, Warren M.	E. E.	1924	<i>Brockton</i>
Chapman, Allen E.	E. E.	1924	<i>Stoneham</i>
Chase, Charles S.	E. E.	1922	<i>Leicester</i>
Chase, Fred W., Jr.	C. E.	1924	<i>Newburyport</i>
Cheifitz, Harry	M. E.	1924	<i>No. Wilmington</i>
Cheney, Norman E.	M. E.	1921	<i>Avon</i>
Chilson, Warren A.	Ch. E.	1924	<i>Milford</i>
Chouinard, Louis H.	C. E.	1924	<i>Thompsonville, Conn.</i>
Christenson, Henry L.	E. E.	1924	<i>Lee</i>
Clahane, John	C. E.	1924	<i>Concord</i>
Clarke, Kenneth O.	E. E.	1922	<i>Kingston</i>
Clarke, Robert H.	M. E.	1923	<i>Melrose Highlands</i>
Clarke, William R.	E. E.	1924	<i>Wallingford, Conn.</i>
Cleary, Walter B.	C. E.	1924	<i>Boston</i>
Cleaves, Royden F.	M. E.	1924	<i>Rochester, N. H.</i>
Cleaves, Wynne P.	Ch. E.	1924	<i>Waltham</i>
Clements, George F.	C. E.	1921	<i>Somerville</i>
Clifford, Eugene F.	E. E.	1924	<i>Newton Highlands</i>
Coakley, Roger G.	M. E.	1924	<i>Beverly</i>
Cobban, John D.	M. E.	1924	<i>Groveland</i>
Coburn, Wendell F.	Ch. E.	1924	<i>Braintree</i>
Coffin, Charles C.	M. E.	1924	<i>Nantucket</i>
Colburn, Hardy R.	M. E.	1924	<i>Boston</i>
Collins, Desmond M.	M. E.	1921	<i>Dorchester</i>
Connell, John H.	Ch. E.	1923	<i>Roxbury</i>
Converse, Everett C.	M. E.	1923	<i>Springfield</i>
Cook, Harold S.	C. E.	1922	<i>Boston</i>
Cook, Hiram J.	M. E.	1923	<i>Franklin</i>
Cooke, Frank N., Jr.	E. E.	1923	<i>Danvers</i>
Cooke, Howard W.	E. E.	1922	<i>Athol</i>
Coombs, Seldon P.	M. E.	1922	<i>Medford</i>
Cooper, Charles S.	C. E.	1924	<i>Roxbury</i>
Cooper, George I.	Ch. E.	1924	<i>Dorchester</i>
Cooper, Raphael D.	M. E.	1921	<i>Gloucester</i>
Cox, Allan N.	Ch. E.	1924	<i>Wellesley</i>
Crabtree, Holmes P.	M. E.	1924	<i>Melrose</i>
Crafts, Harold W.	E. E.	1924	<i>Ashfield</i>
Cramer, George W.	C. E.	1921	<i>Willimansett</i>
Cressy, Dustin G.	E. E.	1922	<i>W. Somerville</i>
Crossman, Hartwell H.	C. E.	1923	<i>Barrowsville</i>
Cummings, John J.	C. E.	1923	<i>Roxbury</i>
Cummings, Roscoe L.	Ch. E.	1924	<i>Belmont</i>
Cundari, Frank A.	C. E.	1921	<i>So. Boston</i>
Cundari, Joseph V.	Ch. E.	1924	<i>So. Boston</i>
Curran, Francis M.	M. E.	1924	<i>Holyoke</i>
Curtis, Freeman D.	M. E.	1924	<i>Somerville</i>
Cushing, Levi G.	E. E.	1923	<i>So. Duxbury</i>
Cushing, Samuel A.	E. E.	1924	<i>Beverly</i>
Cusolito, Lawrence A., Jr.	Ch. E.	1924	<i>Boston</i>
Damiani, Roland	C. F.	1924	<i>Beverly</i>
Damon, Donald B.	Ch. E.	1923	<i>Keene, N. H.</i>
Davis, Leon P.	C. E.	1923	<i>Kennebunk, Me.</i>
Davis, Stuart S.	E. E.	1922	<i>Beverly</i>

# REGISTER OF STUDENTS

NAME	COURSE	YEAR	HOME ADDRESS
Dawe, Allen S.	C. E.	1923	Cambridge
Dearborn, Elmore L.	C. E.	1922	Hampton, N. H.
Deery, Joseph	M. E.	1924	Fitchburg
Dennis, Francis F.	C. E.	1922	Salem
Deuse, James	M. E.	1924	Chester, Conn.
Dingwall, Addison P.	E. E.	1924	No. Weymouth
Dixon, Herbert C.	C. E.	1923	Gloucester
Doane, Kendric P.	C. E.	1921	Groveland
Donnelly, Robert L.	C. E.	1923	Beverly
Douglas, Alton L.	M. E.	1923	East Hiram, Me.
Dove, Walter F.	C. E.	1924	Dover
Downey, Ralph S.	M. E.	1922	Hingham
Drapeau, Lucien	C. E.	1924	Lowell
Durgin, Harold L.	C. E.	1924	Kittery, Me.
Duston, Carmillus W.	M. E.	1923	Wellesley
Dyer, Nathaniel B.	E. E.	1923	Salem
Dyke, Herman R.	E. E.	1924	Livermore Falls, Me.
Dyson, Charles A.	M. E.	1924	Springfield
Eldridge, Gordon B.	Ch. E.	1924	Concord
Elliott, Frank R.	Ch. E.	1924	Springfield
Ellis, Russell F.	M. E.	1924	Southington, Conn.
Ellms, Lindsay	E. E.	1923	Cohasset
Ely, Rodney B.	C. E.	1924	Centerbrook, Conn.
Emery, Carl B.	C. E.	1924	Portland, Me.
Engstrand, Waldo	E. E.	1923	Cranston, R. I.
Engstrom, Howard T.	Ch. E.	1922	Plymouth
Erskine, James S.	E. E.	1923	Newburyport
Everett, Albert E.	C. E.	1923	Everett
Ewell, Frederick A.	E. E.	1924	Medford
Falt, Gordon H.	E. E.	1924	Northeast Harbor, Me.
Farley, Arthur W.	M. E.	1922	Salem
Faunce, Lawrence S.	M. E.	1922	E. Rochester, N. H.
Fearing, Edward W.	E. E.	1921	So. Weymouth
Ferguson, Arthur W.	E. E.	1924	Everett
Ferguson, John H.	Ch. E.	1924	Rochester, N. H.
Fiske, Paul A.	E. E.	1924	Waltham
Fitzmaurice, John V.	C. E.	1924	Marlboro
Flagg, Walter E.	E. E.	1922	Wellesley
Flanders, Henry R.	E. E.	1923	Vineyard Haven
Flood, Frank L.	C. E.	1922	Framingham
Foisie, George E.	C. E.	1923	Nashua, N. H.
Ford, James B.	E. E.	1924	Melrose
Foster, Harry B.	E. E.	1924	Medford
Fowler, William H.	C. E.	1922	Melrose
Fox, Edward	Ch. E.	1922	Roxbury
Fox, F. Sumner	E. E.	1922	Newburyport
Fraser, William A.	E. E.	1923	Vinalhaven, Me.
Freeman, Isadore	Ch. E.	1924	Winthrop
Freeman, James A.	C. E.	1924	Attleboro Falls
Frye, Richard	M. E.	1922	Royalston
Fundin, Hjalmar O. E.	M. E.	1923	Mattapan
Furrier, Joseph P.	C. E.	1923	Lynn
Fusek, Joseph	M. E.	1923	Budapest, Hungary

# SCHOOL OF ENGINEERING

NAME	COURSE	YEAR	HOME ADDRESS
Gadaire, Clifford E.	C. E.	1924	Brookfield
Gaffey, Francis	M. E.	1922	Salem
Gaffney, Melvin S.	E. E.	1924	Essex
Gallagher, George T.	C. E.	1924	Dorchester
Garney, Emery W.	C. E.	1924	Bridgewater
Gilbert, Merton L.	E. E.	1923	Cohasset
Gillis, John A.	M. E.	1924	Cohasset
Gladding, Richard S.	Ch. E.	1922	Beverly
Gleason, Carl B.	Ch. E.	1923	Marblehead
Goddard, George W.	M. E.	1924	Somerville
Gold, Myer	E. E.	1924	Avon, Conn.
Gordon, Morris J.	Ch. E.	1921	Boston
Gordon, Phineas	C. E.	1923	Boston
Goucher, Charles L.	C. E.	1922	Milford
Gould, Joseph E.	Ch. E.	1922	Roxbury
Goulet, Narcisse T.	Ch. E.	1922	Pawtucket, R. I.
Graham, Warren J.	M. E.	1924	Marlboro
Gray, Ernest W.	Ch. E.	1923	Scituate
Greene, Harold L.	E. E.	1924	West Hanover
Grover, James M.	Ch. E.	1924	Wellesley
Grozier, John W.	E. E.	1923	Foxboro
Grushky, Maurice	C. E.	1924	Beverly
Gunther, Frederick E.	E. E.	1922	Roslindale
Haines, Joseph E.	M. E.	1924	Boston
Hale, Harold W.	C. E.	1922	Swansea
Hall, Earl L.	E. E.	1924	Hardwick, Vt.
Hammond, Cleon C.	E. E.	1923	Abington
Harding, Arthur E.	C. E.	1922	Boston
Harlow, Elmer R.	C. E.	1924	Plymouth
Harrington, Frank C.	E. E.	1924	Putnam, Conn.
Harrington, Webster F., Jr.	M. E.	1924	So. Lincoln
Haskell, J. Reginald	M. E.	1924	Webster
Haskins, Howard L.	M. E.	1924	Wollaston
Haslam, Fenton J.	Ch. E.	1924	Keene, N. H.
Hatch, Douglas P.	M. E.	1923	Lynn
Hathaway, Chauncey E.	Ch. E.	1922	Dorchester
Hawks, Robert A.	E. E.	1924	Newton Center
Hayes, John A.	Ch. E.	1924	So. Boston
Heap, Sheldon S.	E. E.	1921	Atlantic
Heinlein, Martin L.	E. E.	1923	So. Natick
Henry, Malcolm C.	E. E.	1924	Bridgeport, Conn.
Hiatt, Frank C.	E. E.	1923	Malden
Hill, George B.	Ch. E.	1923	Berlin, N. H.
Hills, Charles S.	E. E.	1921	So. Natick
Hitchcock, Roy C.	E. E.	1924	Conway
Hjelmberg, Arthur G.	M. E.	1923	Boston
Hobart, Merrill C.	C. E.	1924	Quincy
Holland, Carl T.	E. E.	1923	Nantasket
Holthaus, Frederick J.	E. E.	1922	Beachmont
Hopkins, Forrest R.	M. E.	1923	Franklin, N. H.
Howard, J. Masury	E. E.	1924	Providence, R. I.
Howe, Bernard R.	E. E.	1924	Fryeburg, Me.
Howe, Myron	C. E.	1921	Framingham

# REGISTER OF STUDENTS

NAME	COURSE	YEAR	HOME ADDRESS
Hubby, Leon F.	E. E.	1924	Lee
Hulsman, David L.	Ch. E.	1922	Everett
Hulsman, Kenneth G.	C. E.	1924	Everett
Huntington, Clarence M.	M. E.	1923	Cambridge
Ireland, Theodore S.	M. E.	1922	Gloucester
Irish, Herbert W.	E. E.	1924	Waltham
Jacobson, Howard V.	E. E.	1924	Concord
Jennings, Lawrence W.	M. E.	1923	Winthrop
Johnson, Joseph E.	M. E.	1923	Roxbury
Johnson, Paul R.	C. E.	1924	Feeding Hills
Johnson, Walter A.	M. E.	1924	Dorchester
Johnston, Edwin D.	E. E.	1924	Groveland
Jones, Archibald L.	E. E.	1923	Middleton
Jones, Harold H.	C. E.	1923	Swampscott
Jordan, John E., 2nd	Ch. E.	1924	Gloucester
Junior, Francis	C. E.	1922	Plymouth
Katranis, George A.	E. E.	1924	Sourjys, Greece
Keene, Burton F.	E. E.	1923	So. Hanson
Keith, James B.	Ch. E.	1921	Elmwood
Kelleher, James J.	M. E.	1922	Salem
Kelleher, John P.	M. E.	1924	Charlestown
Kelley, Thomas G.	M. E.	1922	Roslindale
Kelly, Harold W.	C. E.	1924	Dorchester
Kendrew, Albert E.	C. E.	1924	Roslindale
Kennedy, Walter	E. E.	1923	Concord Junction
Kenney, David J.	C. E.	1923	Boston
Kenney, Francis B.	C. E.	1924	Manchester, N. H.
Kenney, John H.	M. E.	1923	Boston
King, William H.	E. E.	1924	Everett
Knight, Frank L.	E. E.	1924	Malden
Knight, Vernon H.	E. E.	1924	Brockton
Knopp, Otto R. H.	E. E.	1923	E. Taunton
Kneupfer, Charles F.	M. E.	1923	Boston
Kosak, Nathaniel	Ch. E.	1924	Everett
Kumpel, Edgar W.	C. E.	1924	Everett
LaBree, Frank H.	E. E.	1921	Medford Hillside
LaMarche, Logan	C. E.	1923	Cambridge
Lamarine, Alfred E.	E. E.	1924	Natick
Lamson, Myles	E. E.	1924	Belmont
Lancaster, Elon F.	E. E.	1923	Madison, Me.
Landry, Herbert A.	M. E.	1921	Norwood
Lane, Charles M., Jr.	E. E.	1924	Hartford, Conn.
Lane, Roy H.	Ch. E.	1924	Rockport
Lanois, Ovide S.	C. E.	1924	Marlboro
Larson, C. William	M. E.	1923	Worcester
Lassof, Israel	Ch. E.	1924	Lexington
Lattanzi, Alfred	C. E.	1921	Everett
Laubenstein, Karl G.	Ch. E.	1924	Maynard
Laurentzen, Walter M.	Ch. E.	1924	Mattapan
Law, William H.	C. E.	1924	Rockport
Lawler, G. Harold	E. E.	1922	Newburyport
Lawler, John D.	Ch. E.	1923	Lowell
Leavitt, Curtis G.	C. E.	1924	Taunton

# SCHOOL OF ENGINEERING

NAME	COURSE	YEAR	HOME ADDRESS
Leavitt, Howard L.	E. E.	1924	Roxbury
Lee, I. Albert	E. E.	1922	Salem
Lee, Alfred	E. E.	1924	Lawrence
Lee, Walter H.	C. E.	1922	Dorchester
Letourneau, Roland F.	Ch. E.	1923	Rockland
Levin, Eli	Ch. E.	1923	Roxbury
Levine, Samuel	C. E.	1922	Roxbury
Levy, E. Frank	Ch. E.	1924	Lynn
Levy, Hyman	E. E.	1923	Boston
Lewis, Clarence W.	E. E.	1924	Beverly
Lewis, Ervin H.	E. E.	1923	Newtonville
Lilley, Wallace H.	C. E.	1923	Chicopee
Lindsay, Edward A.	M. E.	1924	Wollaston
Linskog, Sidney W.	E. E.	1924	Brockton
Lord, Irwin M.	Ch. E.	1924	Natick
Lovejoy, Richard P.	Ch. E.	1922	Franklin
Loubris, Gaston E.	E. E.	1923	Wakefield
Loud, Emery S.	Ch. E.	1923	Rockland
Low, Elmer F.	C. E.	1924	Portland, Me.
Lucas, Ernest H.	Ch. E.	1924	Magnolia
Lundin, Erik H.	E. E.	1923	Procter, Vt.
Luther, Justin J.	M. E.	1924	Hadlyme, Conn.
MacDonald, Robert M. T.	M. E.	1924	W. Roxbury
McElhinney, Earle S.	M. E.	1924	Lynn
McFarland, Dwight F.	Ch. E.	1924	Solon, Me.
McKenne, Charles D.	M. E.	1923	Everett
McKewen, George D.	Ch. E.	1924	Eastport, Me.
McLeod, Edward	C. E.	1924	Lynn
McManus, John P.	C. E.	1923	Roxbury
McSweeney, William H.	M. E.	1924	Salem
Mahoney, John H.	E. E.	1924	Salem
Malloy, John W.	M. E.	1924	Roxbury
Malnate, William F.	C. E.	1924	Quincy
Maloney, Edward F.	Ch. E.	1922	Dorchester
Marcus, Jacob	Ch. E.	1921	Winthrop
Marcus, Maurice	C. E.	1922	Dorchester
Marsh, Charles G.	E. E.	1921	Newburyport
Marsh, Rudolph A.	M. E.	1924	Cambridge
Marshall, Elmer P.	Ch. E.	1924	Allston
Marshall, James P.	E. E.	1923	Hallowell, Me.
Martin, B. Malcolm	M. E.	1924	Swampscott
Martinelli, Henry C.	M. E.	1924	Springfield
Mason, Charles F.	E. E.	1924	Pownal, Vt.
May, Charles A.	C. E.	1924	Fair Haven, Vt.
Mead, Carl E.	M. E.	1921	Willimansett
Meade, William H., Jr.	E. E.	1923	Peabody
Messier, Joseph H.	E. E.	1924	Quincy
Miller, Wallace C.	Ch. E.	1924	So. Hanover
Milne, David C.	C. E.	1923	Hackensack, N. J.
Moody, Donald C.	M. E.	1923	Bradford
Moore, Charles K.	C. E.	1924	Fall River
Morgan, Stuart H.	Ch. E.	1922	Medford
Morrell, Stanley	E. E.	1923	Peabody

# REGISTER OF STUDENTS

NAME	COURSE	YEAR	HOME ADDRESS
Murphy, Charles L.	C. E.	1924	Worcester
Nagakura, Kohe	Ch. E.	1924	Tokio, Japan
Nason, George L.	M. E.	1923	Holbrook
Newman, Irving M.	E. E.	1924	Boston
Nicholson, Donald A.	Ch. E.	1924	Lynn
Nickerson, Clarence W.	M. E.	1921	E. Braintree
Nolan, J. Henry	C. E.	1923	Jamaica Plain
Norberg, Ernest M.	C. E.	1922	Medford
Nowell, Charles A., Jr.	Ch. E.	1924	Bellows Falls, Vt.
Nylin, Carl G.	M. E.	1922	Worcester
Nyman, Chester	C. E.	1922	Marlboro
Oakman, Roger G.	C. E.	1924	Neponset
O'Connell, Harold J.	E. E.	1924	Boston
Oliva, John F.	E. E.	1924	E. Weymouth
Outlaw, Cornelius H.	E. E.	1924	Los Angeles, Calif.
Parad, Emanuel	M. E.	1922	Boston
Parker, Alton D.	E. E.	1923	Quincy
Parsons, Edward S.	C. E.	1922	Gloucester
Parsons, William N.	C. E.	1924	Gloucester
Pascoe, Thomas E.	M. E.	1922	Chocorua, N. H.
Paulson, Iver E.	Ch. E.	1923	Woburn
Paver, William H.	M. E.	1922	Franklin
Pearce, Howard T.	C. E.	1922	Concord Junction
Pearson, Carl R.	C. E.	1922	Winthrop
Peck, Donald L.	E. E.	1923	Framingham
Penniman, John	C. E.	1924	Whitman
Perley, George T.	E. E.	1924	Wollaston
Perry, Alfred L.	M. E.	1924	Everett
Perry, Edward J.	M. E.	1923	Putnam, Conn.
Perry, Gilbert F.	C. E.	1921	Putnam, Conn.
Perry, John A.	Ch. E.	1924	Reading
Perry, Norman E.	Ch. E.	1923	Dedham
Peterson, Clarence W.	M. E.	1923	Everett
Peterson, Vernon R.	M. E.	1921	No. Abington
Philbrick, Albert W.	E. E.	1924	Kittery, Me.
Phipps, Chester D.	M. E.	1921	Holliston
Pierce, Webster W.	M. E.	1924	Quincy
Pinkul, Edward J.	C. E.	1924	Dorchester
Potter, Wilson	E. E.	1923	Forestville, Conn.
Pratt, Carl N.	C. E.	1924	Winthrop
Pressey, Wallace E.	M. E.	1924	Exeter, N. H.
Prives, Hyman S.	Ch. E.	1921	East Boston
Pruscino, Alexander	C. E.	1924	Boston
Publicover, Lewis E.	E. E.	1924	Gloucester
Putnam, Charles H.	M. E.	1924	Webster
Quilty, Ralph G.	Ch. E.	1924	Dorchester
Quimby, Hoyt M.	M. E.	1924	Claremont, N. H.
Quinn, John F.	E. E.	1923	Salem
Quint, Dudley	Ch. E.	1923	Lynn
Rabinowitz, Louis	E. E.	1924	Roxbury
Radil, Frederick W.	Ch. E.	1924	New Britain, Conn.
Rantz, Joseph M.	E. E.	1924	Beverly
Ray, William C.	C. E.	1924	Gloucester

# SCHOOL OF ENGINEERING

NAME	COURSE	YEAR	HOME ADDRESS
Read, Alden W.	E. E.	1924	<i>Bridgewater</i>
Reed, Linwood L.	M. E.	1923	<i>Everett</i>
Reed, Miller G.	E. E.	1924	<i>Boothbay Harbor, Me.</i>
Reed, Robert F.	E. E.	1923	<i>Granville Ferry, N. S.</i>
Rhoades, Clifford	C. E.	1922	<i>Bridgewater</i>
Rich, Luke A.	Ch. E.	1923	<i>Newton</i>
Richard, Irene T.	M. E.	1924	<i>Salem</i>
Richards, Walter C.	C. E.	1921	<i>Weymouth</i>
Riggio, Samuel A.	C. E.	1924	<i>Ivoryton, Conn.</i>
Ritchie, J. Harris	Ch. E.	1924	<i>Bridgeport, Conn.</i>
Robbins, Bertrand B.	E. E.	1922	<i>Elmwood</i>
Roberts, George I.	E. E.	1924	<i>E. Weymouth</i>
Robinson, William J.	Ch. E.	1923	<i>Pawtucket, R. I.</i>
Rogers, Allan H.	E. E.	1924	<i>Jonesport, Me.</i>
Root, Burritt A.	M. E.	1923	<i>New Britain, Conn.</i>
Rosen, Philip	Ch. E.	1922	<i>Boston</i>
Rosenblatt, Irving	C. E.	1922	<i>Saxonville</i>
Rubin, Benjamin	C. E.	1923	<i>Roxbury</i>
Rundlett, John C.	C. E.	1924	<i>Newburyport</i>
Russell, Charles C.	E. E.	1923	<i>Exeter, N. H.</i>
Russell, John B.	C. E.	1924	<i>Quincy</i>
Sampson, Edward N.	E. E.	1922	<i>Sharon</i>
Santis, Julius G.	Ch. E.	1921	<i>Boston</i>
Savignac, Alphonse L.	C. E.	1923	<i>Amesbury</i>
Sawtell, Raymond I.	E. E.	1924	<i>Shrewsbury</i>
Schaller, Irving R.	E. E.	1924	<i>Salem</i>
Schwartz, Joseph P.	C. E.	1923	<i>Revere</i>
Schweda, Carl R.	E. E.	1924	<i>Cambridge</i>
Secord, Harold	E. E.	1923	<i>Newton</i>
Semenyna, Waldimir	C. E.	1924	<i>Boston</i>
Shailer, Fisk	Ch. E.	1924	<i>Chester, Conn.</i>
Shaw, J. Arnold	Ch. E.	1924	<i>Danvers</i>
Shaw, Richard C.	M. E.	1923	<i>E. Bridgewater</i>
Shea, Leon H.	E. E.	1924	<i>Rumford, Me.</i>
Shepardson, Lee W.	E. E.	1924	<i>Baldwinville</i>
Shopneck, Henry P.	Ch. E.	1922	<i>Boston</i>
Shumavonian, Sorun P.	C. E.	1924	<i>Dorchester</i>
Shumway, Herbert L.	M. E.	1923	<i>Mattapan</i>
Silverman, Morris	M. E.	1924	<i>Quincy</i>
Simmons, Murray J.	C. E.	1924	<i>Dorchester</i>
Smith, Benjamin L.	E. E.	1923	<i>Concord</i>
Smith, Farnham W.	Ch. E.	1923	<i>Concord</i>
Snyder, Harold B.	E. E.	1924	<i>Exeter, N. H.</i>
Somes, John J.	M. E.	1924	<i>Gloucester</i>
Souther, George H.	M. E.	1924	<i>Winthrop</i>
Southworth, Burton	E. E.	1924	<i>W. Stoughton</i>
Spear, Roger E.	C. E.	1921	<i>Boston</i>
Spector, Benjamin	C. E.	1924	<i>Stoughton</i>
Sperl, Warren	Ch. E.	1922	<i>Auburndale</i>
Squier, Roger W.	C. E.	1924	<i>Boston</i>
Standley, David	C. E.	1921	<i>Beverly</i>
Stanton, Fred J., Jr.	E. E.	1924	<i>Wenham</i>
Staples, Arthur C.	E. E.	1924	<i>Dighton</i>

## REGISTER OF STUDENTS

NAME	COURSE	YEAR	HOME ADDRESS
Staples, Merton T.	C. E.	1921	<i>Danvers</i>
Staples, Paul E.	M. E.	1924	<i>Arlington Heights</i>
Stearns, Elton O.	C. E.	1924	<i>Waltham</i>
Stevens, Thomas A.	E. E.	1923	<i>Deep River, Conn.</i>
Stewart, Daniel	M. E.	1924	<i>Sydney, Nova Scotia</i>
Stewart, Oscar E.	Ch. E.	1923	<i>Saco, Me.</i>
Stillman, Joseph	E. E.	1924	<i>Newburyport</i>
Stimson, Glen H.	M. E.	1924	<i>Athol</i>
Stoddard, Hatherley	M. E.	1923	<i>Salem</i>
Stotz, Herman C.	C. E.	1924	<i>Brighton</i>
Strong, John S.	Ch. E.	1924	<i>Winthrop</i>
Sullivan, John J.	E. E.	1921	<i>Holyoke</i>
Sullivan, William H.	M. E.	1922	<i>Salem</i>
Swanson, Gustaf	Ch. E.	1923	<i>Proctor, Vt.</i>
Swanson, Wallace C.	M. E.	1924	<i>Lynn</i>
Sweetland, William F., Jr.	E. E.	1924	<i>Providence, R. I.</i>
Swett, Lewis A. W.	M. E.	1924	<i>Winthrop</i>
Symonds, Allen M.	Ch. E.	1924	<i>Waban</i>
Tarplin, Emanuel	Ch. E.	1923	<i>Lynn</i>
Taylor, A. Pirrie	M. E.	1924	<i>Dorchester</i>
Taylor, Norman C.	C. E.	1924	<i>Wellesley</i>
Taylor, Robert N.	Ch. E.	1924	<i>Watertown</i>
Tenney, Howard H.	E. E.	1924	<i>Newport, N. H.</i>
Thatcher, John G.	C. E.	1924	<i>Brookline</i>
Thompson, Alan M.	C. E.	1923	<i>Roslindale</i>
Thompson, Harold C.	C. E.	1923	<i>Bridgewater</i>
Thompson, Herbert L.	Ch. E.	1923	<i>Norwood</i>
Thompson-Evans, Owen G.	M. E.	1924	<i>Waltham</i>
Thomson, Claude W. R.	M. E.	1924	<i>Holyoke</i>
Titcomb, Oliver S.	M. E.	1924	<i>Somerville</i>
Toole, Cameron S.	C. E.	1922	<i>Clinton</i>
Traister, Louis	E. E.	1924	<i>Newburyport</i>
Tulloch, Douglas F.	E. E.	1924	<i>Bridgewater</i>
Turner, Burton G.	C. E.	1922	<i>Eastport, Me.</i>
Ulmer, Donald J.	E. E.	1924	<i>Norton</i>
Vandenkerckhoven, William	E. E.	1924	<i>Bethel, Me.</i>
Vigdor, Irving A.	E. E.	1924	<i>Boston</i>
Vincent, George D.	C. E.	1923	<i>Watertown</i>
Vines, Frederick D. L.	E. E.	1924	<i>Greenbush</i>
Wade, Edward A.	E. E.	1924	<i>Jamaica Plain</i>
Waite, Willis H.	E. E.	1924	<i>Shoreham, Vt.</i>
Waldron, F. Elliott	E. E.	1924	<i>Gloucester</i>
Walker, Arthur E.	M. E.	1924	<i>Franklin</i>
Walker, Lawrence D.	Ch. E.	1924	<i>Watertown</i>
Wallace, Albion K.	E. E.	1924	<i>Millbridge, Me.</i>
Wallin, Francis T.	M. E.	1924	<i>Allston</i>
Warner, David G.	M. E.	1924	<i>Sterling</i>
Warner, W. Darrington	E. E.	1924	<i>Newburyport</i>
Weeks, Byron	M. E.	1924	<i>Tisbury</i>
Wentworth, Clarence	M. E.	1922	<i>Revere</i>
Werth, Lloyd L.	M. E.	1921	<i>Rochester, N. Y.</i>
West, Harold E.	E. E.	1924	<i>Chester</i>
Westland, Walter N.	C. E.	1924	<i>Somerville</i>

## SCHOOL OF ENGINEERING

Weston, Philip O.	E. E.	1924	<i>Mattapan</i>
Wetmore, George H.	E. E.	1924	<i>Peabody</i>
Wheeler, Clifford	Ch. E.	1922	<i>Malden</i>
Wheeler, Harold W.	Ch. E.	1924	<i>Winthrop</i>
White, George W.	C. E.	1924	<i>E. Woodstock, Conn.</i>
Whiton, Wilson	M. E.	1923	<i>Hingham</i>
Wilbur, Fowler W.	E. E.	1924	<i>Springfield</i>
Wilcox, Arthur L.	C. E.	1924	<i>Maynard</i>
Wilkins, Henry M.	C. E.	1921	<i>Marblehead</i>
Willey, Laurence V.	C. E.	1924	<i>Skowhegan, Me.</i>
Williams, Charles I.	M. E.	1922	<i>Quincy</i>
Williams, Edwin C.	C. E.	1922	<i>Natick</i>
Willis, Howard A.	Ch. E.	1923	<i>Melrose Highlands</i>
Wilson, Karl E.	E. E.	1924	<i>No. Wilmington</i>
Wineblatt, Michael	E. E.	1924	<i>Salem</i>
Wood, Arthur S.	C. E.	1924	<i>Portland, Me.</i>
Wood, Manson E.	M. E.	1923	<i>Wakefield</i>
Wright, John L.	E. E.	1924	<i>No. Attleboro</i>
Wright, Maurice H.	Ch. E.	1924	<i>Springfield</i>
Wright, Moses E., Jr.	E. E.	1922	<i>Newburyport</i>
Young, Claude	M. E.	1924	<i>Quincy</i>
Young, Horace B.	M. E.	1923	<i>Atlantic</i>
Young, Nelson B.	M. E.	1922	<i>Reading</i>
Young, Walter H.	E. E.	1924	<i>Matinicus, Me.</i>
Young, Wilfred A.	E. E.	1923	<i>Baltic, Conn.</i>
Zak, Alexander M.	C. E.	1924	<i>Boston</i>
Ziegler, Albert G.	Ch. E.	1924	<i>Deep River, Conn.</i>

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**NORTHEASTERN COLLEGE  
SCHOOL OF ENGINEERING**

*Boston, Mass.,*.....192

*To the Dean:*

*Name in full*.....

*hereby respectfully applies for admission to the*.....  
*Engineering Course of the School of Engineering for the school*  
*year 19     19     , and submits the following data:*

*Residence* ..... *Street*

*Town* .....

*State* ..... *Tel.*.....

*Date of Birth*..... *Age*.....

*Parent (father's) Name* .....

“            “            *Address* .....

*Graduate of*..... *High School. Year*.....

*Location of High School*.....

*If not a graduate, how many years were you in High School?*

*When did you leave?*.....

*Why did you leave?*.....

*Name of Principal*.....

*If employed since graduation, what is the name of your em-*  
*ployer?* .....

*Employer's address* .....

*Names and addresses of two other persons, not clergymen, to*  
*whom we may direct inquiries concerning you. (Give former*  
*employers' if possible.)*

.....  
.....  
.....  
*If admitted to the school do you plan to complete the full four*  
*years' course and qualify for the degree?*.....

*When do you wish to start Engineering Practice?.....*

*Have you a position which you wish to retain in co-operation with the School?.....*

Where will you live during the school-year? .....

*Weight* ..... *Height* .....

*Have you any physical infirmities?*.....

*Is your general health good, fair, or poor?* \_\_\_\_\_

*Additional Remarks:*

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# **NORTHEASTERN COLLEGE**

## **AND AFFILIATED SCHOOLS**

---

### **DAY SCHOOL**

#### **School of Engineering**

Four-year courses in Civil, Mechanical, Electrical, and Chemical Engineering, leading to the degrees of Bachelor of Civil, Mechanical, Electrical, and Chemical Engineering: B. C. E., B. M. E., etc. The school is operated in co-operation with engineering firms. Students earn while learning. Open to high school graduates.

### **EVENING SCHOOLS**

#### **School of Law**

Four-year course leading to the degree of Bachelor of Laws. Complete preparation for the Bar examinations and the practice of law. Case method of instruction. Day school standards of scholarship. Courses organized for business men who desire a legal training. Open to high school graduates or men with an equivalent education. A limited number of men of maturity and experience admitted each year as special students, not candidates for the L. L. B. degree.

#### **School of Commerce and Finance**

Four-year courses including Accounting, Auditing, and Business Administration, leading to degrees of Bachelor of Commercial Science and Master of Commercial Science.

Complete preparation for state examinations for Certified Public Accountants and for business executives.

### **AFFILIATED SCHOOLS**

#### **Northeastern Evening Polytechnic School**

A school offering three-year college courses in Civil, Mechanical, Electrical, Chemical, and Structural Engineering leading to a diploma. The school trains men for positions of trust and responsibility.

#### **Northeastern Preparatory School**

Courses of High School grade in English, Ancient and Modern Languages, Mathematics, History, Economics, Government, Chemistry, Physics, Penmanship, Bookkeeping, Shorthand, and Mechanical Drawing. Instructors from High Schools in Boston and suburbs. The school offers facilities for a four-year course in the evening, and is in session for three terms of sixteen weeks each year. It is possible for students to meet college entrance requirements in from three to five years of evening work.

---

*For further information concerning any of the above schools,  
address*

**NORTHEASTERN COLLEGE**  
**316 Huntington Avenue, Boston 17, Massachusetts**

# **SCHOOL OF ENGINEERING**



FOUNDED FOR THE INSTRUCTION  
OF MEN IN THE THEORY AND  
PRACTICE OF ENGINEERING

# Northeastern College

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## School of Engineering



### Announcement *of* New Course in Administrative Engineering

1921 - 1922

NORTHEASTERN COLLEGE  
Boston Young Men's Christian Association  
316 Huntington Avenue, Boston, Mass.

# NORTHEASTERN COLLEGE

## Calendar for the Class Entering in September, 1921

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### Entrance Examinations in Boston

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#### Entrance Examinations:

June 16, Thursday, and September 8, 1921, Thursday

10.00 A. M. to 12.00 M. .... Algebra  
1.00 P. M. to 3.00 P. M. .... Plane Geometry

September 12, Monday, First Term of school year for Division A commences. \*Division B is assigned to Engineering Practice.

October 17, Monday, First Term of school year for Division B commences. \*Division A is assigned to Engineering Practice.

\*Students assigned to Division B may expect assignment to Engineering Practice any time on or after September 12th. Students assigned to Division A are usually placed at Engineering Practice immediately at the close of the first school period.

### EQUIPMENT AVAILABLE FOR ENGINEERING SCHOOL STUDENTS

36 Class Rooms	Civil Engineering
5 Drawing Rooms	Equipment
3 Chemical Laboratories	2 Libraries
1 Electrical Engineering Laboratory	3 Social Rooms
1 Electrical Measurements Laboratory	3 Game Rooms
1 Mechanical Engineering Laboratory	3 Gymnasiums
2 Physics Laboratories	1 Swimming Pool
	2 Large Halls
	8 Offices and Equipment

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26 Members of Faculty  
10 Assistants

133 Co-operating Firms  
590 Students Enrolled

# SCHOOL OF ENGINEERING

## V. ADMINISTRATIVE ENGINEERING

There is a great and growing demand for engineers with a knowledge of accounting, system building, and management, to act as executive officers, managers, superintendents and efficiency engineers of our industrial plants, transportation systems and public utilities. At present it is impossible to meet this demand. Many attractive positions are open to men qualified for this work.

The faculty of the school has planned the course in Administrative Engineering to meet this need. It provides a training for men who desire to enter such positions which demand a knowledge of business, scientific and engineering principles. It combines the instruction in engineering subjects with the study of accounting, law and methods of business. The course includes the instruction common to all courses in English, Mathematics, Mechanical Drawing, Physics, Applied Mechanics, Heat Engineering, and Engineering Conference; a selected group of subjects in accounting, law, and business; an option of engineering subjects classified under: Civil Engineering or Mechanical Engineering.

The course is planned so as to train students to analyze commercial, industrial and employment problems. Special emphasis is placed upon accounting, law, system building, scientific management and labor problems, industrial organization, and business management. The course is not designed to train men as auditors and accountants, but rather to be of service to administrative officers in analyzing accounts and financial reports.

Students completing this course satisfactorily with options one or two will become candidates for the degrees of Bachelor of Civil Engineering, or Bachelor of Mechanical Engineering, respectively.

*NORTHEASTERN COLLEGE*  
STUDENTS ENGAGED IN ENGINEERING  
PRACTICE



Making a Plane Table Survey  
Class in Surveying Fieldwork



Making Tensile Tests on Steel  
General Electric Company — Lynn

# SCHOOL OF ENGINEERING

## V. ADMINISTRATIVE ENGINEERING

### FIRST YEAR

FALL TERM	Hours per week Ex. Prep.	SPRING TERM	Hours per week Ex. Prep.
010-1 English .....	2 4	010-1 English .....	2 4
020-1 College Algebra .....	3 6	020-1 Analytic Geometry ...	4 6
021-1 Trigonometry .....	4 6	030-1 Physics Laboratory ...	2 2
030-1 Physics Laboratory ..	2 2	031-1 Physics .....	4 8
040-1 Mechanical Drawing ..	5 0	041-2 Mechanical Drawing ..	4 0
90-1 Physical Training ....	2 0	90-1 Physical Training ....	5 2
Options		Options	
1. { 11-1 Surveying .....	2 4	1. { 11-1 Surveying .....	2 4
{ 11-2 Surveying F. & P... 5 0	5 0	{ 11-2 Surveying F. & P... 5 0	5 0
2. { 24-1 Production Eng'g... 2 3	2 3	2. { 041-3 Mech. Drawing ... 5 0	5 0
{ 40-1 Inorganic Chem'y .. 4 4	4 4	{ 24-2 Production Eng'g .. 2 3	2 3
043-1 *Descriptive Geometry.	20 10		
061-1 *Economics .....	5 10		
90-1 *Physical Training ...	2 0		

### SECOND YEAR

FALL TERM	Hours per week Ex. Prep.	SPRING TERM	Hours per week Ex. Prep.
023-1 Calculus .....	4 6	023-2 Calculus .....	3 6
031-2 Physics Laboratory...	2 2	032-2 Physics Laboratory ...	2 2
032-1 Light .....	3 3	032-3 Heat .....	3 4
21-1 Applied Mechanics ...	3 6	21-1 Applied Mechanics ...	3 4½
30-1 Elements of Electricity	2 2	30-1 Elements of Electricity	2 2
50-1 Eng'g Conference ....	1 0	50-1 Engineering Conference	1 0
Options		Options	
1. { 042-1 Machine Drawing. 3 0	3 0	1. { 14-1 Theory of Structures 3 6	3 6
{ 11-3 Surveying .....	2 4	{ 14-2 Structural Drawing. 3 3	3 3
{ 11-4 Surveying F. & P. ... 5 0	5 0	{ 033-1 Preci's'n of Meas'ts 1 1	1 1
2. { 042-3 Machine Drawing. 6 0	6 0	2. { 044-3 Mechanism .....	6 6
{ 044-2 Mechanism .....	4 4		
062-1 *Government .....	5 10		
Options			
1. 044-1 *Mechanism .....	15 10		
2. 042-4 *Machine Drawing..	30 0		

\*Summer Term: Three Weeks

# NORTHEASTERN COLLEGE

## V. ADMINISTRATIVE ENGINEERING

### THIRD YEAR

FALL TERM		Hours per week Ex. Prep.	SPRING TERM		Hours per week Ex. Prep.
065-1	Princ. of Accounting ..	3 6	065-1	Princ. of Accounting...	3 6
066-1	Indust'l Organization ..	3 6	066-1	Indust'l Organization ..	3 6
21-2	Strength of Materials..	3 6	16-1	Materials .....	2 4
50-1	Eng'g Conference .....	1 0	21-2	Strength of Materials..	3 6
	Options		50-1	Eng'g Conference .....	1 0
1.	{ 12-3 R.R. Engineering ..	3 6		Options	
	{ 12-4 R.R. Eng'g. F. & P.	5 0	1.	{ 14-1 Theory of Structures	3 6
	{ 40-1 Inorganic Chemistry	4 4		{ 14-2 Structural Drawing .	3 3
	{ 21-1 Graphical Analysis..	6 2		{ 22-2 Elem. Mach. Design	6 2
2.	{ 23-1 Heat Engineering ..	3 6	2.	{ 23-1 Heat Engineering ..	3 6
	{ 24-3 Power Plant Equip.	2 4			
	063-1 *History of Science....	5 10			
	13-1 *Hydraulics .....	10 20			
	Option				
	2. 11-5 *Surveying .....	5 0			

### FOURTH YEAR

(Omitted 1921-1922)

FALL TERM		Hours per week Ex. Prep.	SPRING TERM		Hours per week Ex. Prep.
066-2	Scientific Management.	3 6	065-2	Cost Accounting.....	2 4
067-1	Banking and Finance ..	3 6	066-3	Traffic Management ..	3 6
068-1	Business Law .....	2 4	50-1	Eng'g Conference .....	1 0
50-1	Eng'g Conference .....	1 0	51-1	Thesis.....	1 6
	Options			Options	
1.	{ 14-3 Eng'g Structures ...	6 12	1.	{ 14-3 Eng'g Structures ...	6 12
	{ 14-4 Structural Design ..	6 0		{ 14-4 Structural Design ..	6 0
	{ 22-3 Machine Design ...	6 2		{ 17-1 Highway Eng'g ....	2 2
	{ 23-2 Eng'g Laboratory ..	2 2		{ 22-3 Machine Design ...	6 4
2.	{ 23-5 Heat Engineering ..	2 4	2.	{ 24-6 Standard Engineer-	
	{ 25-1 Industrial Plants...	3 5		{ ing Products & Proc's .	2 4
				{ 25-1 Industrial Plants ..	4 4

\* Summer Term: Three Weeks

# SCHOOL OF ENGINEERING

## REQUIREMENTS FOR ADMISSION

Applicants for admission as regular students to the School of Engineering are required to present evidence of graduation from accredited four-year high schools, or the equivalent, and to have included in their courses of study Algebra as far as Quadratics and Plane Geometry. The completion of fifteen units of preparatory subjects satisfactory to the Committee on Admission is considered equivalent qualification.

Students whose high school courses have not included the required Algebra and Plane Geometry must take special entrance examinations, the dates of which are scheduled on page two. Certificates of entrance examinations passed for admission to colleges, or technical schools of good standing, may be accepted in lieu of entrance examinations.

Each applicant is required to fill out an application blank, whereon he states his previous education, as well as the names of persons to whom reference may be made in regard to his character and previous training. Application blanks may be obtained upon request from Carl S. Ell, Dean, 316 Huntington Avenue, Boston, Mass.

## TUITION

An application fee of five dollars is to be paid when the application is filed. The tuition for the full year's work is \$175.00, including membership in the Y. M. C. A. and the gymnasium fee. The tuition fee is divided into four payments.

A student activities fee of \$10.00 is also charged each student. This fee includes membership in the "Northeastern Engineering A. A."; subscription to the school paper, "Northeastern Tech," and other student privileges.

## ENGINEERING PRACTICE

A student who enrolls in the School is placed at Engineering Practice with a co-operating firm for five weeks; then he attends classes for five weeks. Two students hold the same position and exchange places at school and at Engineering Practice at the beginning of each five-week period.

Each student is paid by the firm for his services during his periods of practical work and is thus enabled to earn while learning. His earnings amount to considerably more than his tuition, the cost of books, drawing instruments and general supplies, train fares, and incidental expenses.

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For a complete catalog of the school or any further information, address Carl S. Ell, Dean, 316 Huntington Avenue, Boston, Mass.



# Northeastern College

January 1922

## CATALOG of the School *of* Engineering 1922-1923

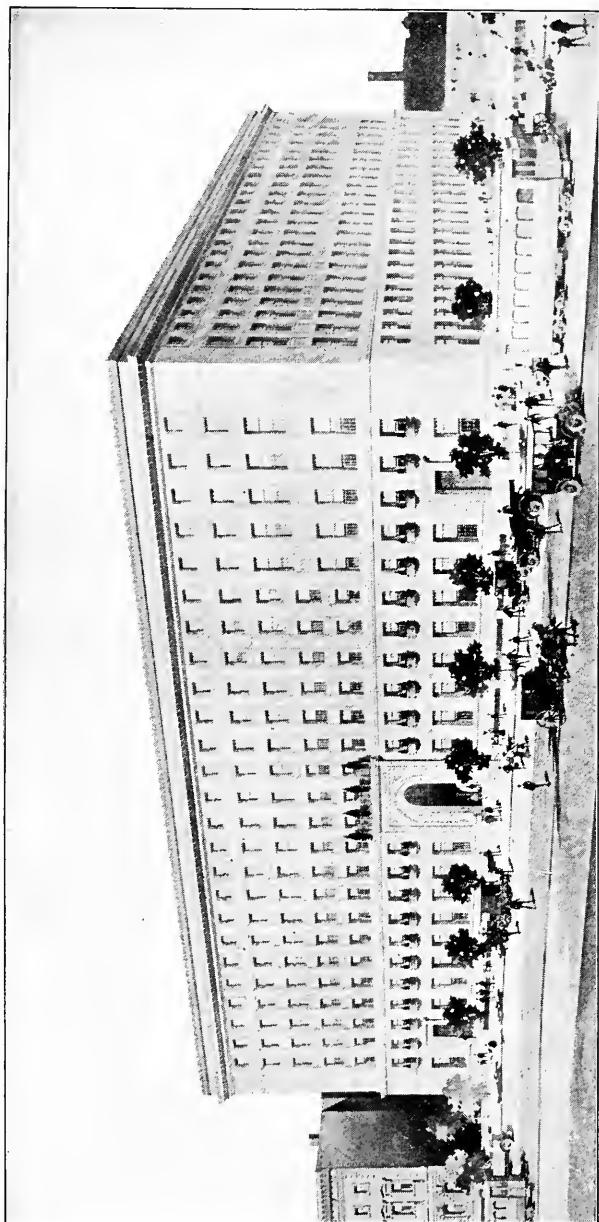
**NORTHEASTERN COLLEGE**

**Boston Young Men's Christian  
Association**

**Number 316 Huntington Ave., Boston, Massachusetts**







ASSOCIATION BUILDING  
NORTHEASTERN COLLEGE  
(MAIN BUILDING)

# Northeastern College

## CATALOG

*of the*

## School of Engineering

Co-operative Plan



1922-1923

NORTHEASTERN COLLEGE

Boston Young Men's Christian Association

# YEARLY CALENDAR

## of School Sessions

1922

1923

JANUARY							JULY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	..	..	..	..	..	..	1
8	9	10	11	12	13	14	2	3	4	5	6	7	8
15	16	17	18	19	20	21	9	10	11	12	13	14	15
22	23	24	25	26	27	28	16	17	18	19	20	21	22
29	30	31	..	..	..	..	23	24	25	26	27	28	29
..	..	..	..	..	..	..	30	31	..	..	..	..	..
FEBRUARY							AUGUST						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	1	2	3	4	..	..	1	2	3	4	5
5	6	7	8	9	10	11	6	7	8	9	10	11	12
12	13	14	15	16	17	18	13	14	15	16	17	18	19
19	20	21	22	23	24	25	20	21	22	23	24	25	26
26	27	28	..	..	..	..	27	28	29	30	31	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..
MARCH							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	1	2	3	4	..	..	..	..	..	1	2
5	6	7	8	9	10	11	3	4	5	6	7	8	9
12	13	14	15	16	17	18	10	11	12	13	14	15	16
19	20	21	22	23	24	25	17	18	19	20	21	22	23
26	27	28	29	30	31	..	24	25	26	27	28	29	30
..	..	..	..	..	..	..	..	..	..	..	..	..	..
APRIL							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	..	..	1	1	2	3	4	5	6	7
2	3	4	5	6	7	8	8	9	10	11	12	13	14
9	10	11	12	13	14	15	15	16	17	18	19	20	21
16	17	18	19	20	21	22	22	23	24	25	26	27	28
23	24	25	26	27	28	29	29	30	31	..	..	..	..
30	..	..	..	..	..	..	..	..	..	..	..	..	..
MAY							NOVEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	1	2	3	4	5	6	..	..	..	1	2	3	4
7	8	9	10	11	12	13	5	6	7	8	9	10	11
14	15	16	17	18	19	20	12	13	14	15	16	17	18
21	22	23	24	25	26	27	19	20	21	22	23	24	25
28	29	30	31	..	..	..	26	27	28	29	30	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..
JUNE							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	1	2	3	4	..	..	..	..	..	1	2
5	6	7	8	9	10	11	3	4	5	6	7	8	9
12	13	14	15	16	17	18	10	11	12	13	14	15	16
19	20	21	22	23	24	25	17	18	19	20	21	22	23
26	27	28	29	30	..	..	24	25	26	27	28	29	30
..	..	..	..	..	..	..	31	..	..	..	..	..	..

JANUARY							JULY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	1	2	3	4	5	6	1	2	3	4	5	6	7
7	8	9	10	11	12	13	8	9	10	11	12	13	14
14	15	16	17	18	19	20	15	16	17	18	19	20	21
21	22	23	24	25	26	27	22	23	24	25	26	27	28
28	29	30	31	..	..	..	29	30	31	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..
FEBRUARY							AUGUST						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	3	..	..	..	1	2	3	4
4	5	6	7	8	9	10	5	6	7	8	9	10	11
11	12	13	14	15	16	17	12	13	14	15	16	17	18
18	19	20	21	22	23	24	19	20	21	22	23	24	25
25	26	27	28	..	..	..	26	27	28	29	30	31	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..
MARCH							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	3	..	..	..	..	..	1	2
4	5	6	7	8	9	10	2	3	4	5	6	7	8
11	12	13	14	15	16	17	9	10	11	12	13	14	15
18	19	20	21	22	23	24	16	17	18	19	20	21	22
25	26	27	28	29	30	31	23	24	25	26	27	28	29
..	..	..	..	..	..	..	30	..	..	..	..	..	..
APRIL							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	..	1	2	3	4	5	6
8	9	10	11	12	13	14	7	8	9	10	11	12	13
15	16	17	18	19	20	21	14	15	16	17	18	19	20
22	23	24	25	26	27	28	21	22	23	24	25	26	27
29	30	..	..	..	..	..	28	29	30	31	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..
MAY							NOVEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	1	2	3	4	5	..	..	..	..	1	2	3
6	7	8	9	10	11	12	4	5	6	7	8	9	10
13	14	15	16	17	18	19	11	12	13	14	15	16	17
20	21	22	23	24	25	26	18	19	20	21	22	23	24
27	28	29	30	31	..	..	25	26	27	28	29	30	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..
JUNE							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	3	..	..	..	..	..	1	2
4	5	6	7	8	9	10	3	4	5	6	7	8	9
11	12	13	14	15	16	17	10	11	12	13	14	15	16
18	19	20	21	22	23	24	17	18	19	20	21	22	23
25	26	27	28	29	30	..	24	25	26	27	28	29	30
..	..	..	..	..	..	..	31	..	..	..	..	..	..

School Periods for Division A indicated by type thus: 1 2 3.  
 School Periods for Division B indicated by type thus: 1 2 3.  
 Periods when School is not in session indicated by type thus: 1 2 3.

# YEARLY CALENDAR

## *of Engineering Practice Periods for Upper-Classmen*

1922

1923

JANUARY							JULY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	...	...	...	...	...	...	1
8	9	10	11	12	13	14	2	3	4	5	6	7	8
15	16	17	18	19	20	21	9	10	11	12	13	14	15
22	23	24	25	26	27	28	16	17	18	19	20	21	22
29	30	31	...	...	...	...	23	24	25	26	27	28	29
...	...	...	...	...	...	...	30	31	...	...	...	...	...
FEBRUARY							AUGUST						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
...	...	...	1	2	3	4	...	...	...	...	...	...	...
5	6	7	8	9	10	11	6	7	8	9	10	11	12
12	13	14	15	16	17	18	13	14	15	16	17	18	19
19	20	21	22	23	24	25	20	21	22	23	24	25	26
26	27	28	...	...	...	...	27	28	29	30	31	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
MARCH							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
...	...	...	1	2	3	4	...	...	...	...	...	1	2
5	6	7	8	9	10	11	3	4	5	6	7	8	9
12	13	14	15	16	17	18	10	11	12	13	14	15	16
19	20	21	22	23	24	25	17	18	19	20	21	22	23
26	27	28	29	30	31	...	24	25	26	27	28	29	30
...	...	...	...	...	...	...	...	...	...	...	...	...	...
APRIL							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
...	...	...	...	...	...	1	1	2	3	4	5	6	7
2	3	4	5	6	7	8	8	9	10	11	12	13	14
9	10	11	12	13	14	15	15	16	17	18	19	20	21
16	17	18	19	20	21	22	22	23	24	25	26	27	28
23	24	25	26	27	28	29	29	30	31	...	...	...	...
30	...	...	...	...	...	...	...	...	...	...	...	...	...
MAY							NOVEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
...	...	...	...	...	...	1	...	...	...	...	...	...	...
7	8	9	10	11	12	13	5	6	7	8	9	10	11
14	15	16	17	18	19	20	12	13	14	15	16	17	18
21	22	23	24	25	26	27	19	20	21	22	23	24	25
28	29	30	31	...	...	...	26	27	28	29	30	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
JUNE							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
...	...	...	...	...	...	1	...	...	...	...	...	...	...
4	5	6	7	8	9	10	3	4	5	6	7	8	9
11	12	13	14	15	16	17	10	11	12	13	14	15	16
18	19	20	21	22	23	24	17	18	19	20	21	22	23
25	26	27	28	29	30	...	24	25	26	27	28	29	30
...	...	...	...	...	...	...	31	...	...	...	...	...	...

JANUARY							JULY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	1	2	3	4	5	6	7
8	9	10	11	12	13	14	8	9	10	11	12	13	14
15	16	17	18	19	20	21	15	16	17	18	19	20	21
22	23	24	25	26	27	28	22	23	24	25	26	27	28
29	30	31	...	...	...	...	29	30	31	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
FEBRUARY							AUGUST						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
...	...	...	...	...	...	1	...	...	...	...	...	...	...
4	5	6	7	8	9	10	5	6	7	8	9	10	11
11	12	13	14	15	16	17	12	13	14	15	16	17	18
18	19	20	21	22	23	24	19	20	21	22	23	24	25
25	26	27	28	...	...	...	26	27	28	29	30	31	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
MARCH							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
...	...	...	...	...	...	1	...	...	...	...	...	...	1
4	5	6	7	8	9	10	2	3	4	5	6	7	8
11	12	13	14	15	16	17	9	10	11	12	13	14	15
18	19	20	21	22	23	24	16	17	18	19	20	21	22
25	26	27	28	29	30	31	23	24	25	26	27	28	29
...	...	...	...	...	...	...	30	...	...	...	...	...	...
APRIL							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	...	...	...	...	...	...	...
8	9	10	11	12	13	14	7	8	9	10	11	12	13
15	16	17	18	19	20	21	14	15	16	17	18	19	20
22	23	24	25	26	27	28	21	22	23	24	25	26	27
29	30	...	...	...	...	...	28	29	30	31	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
MAY							NOVEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
...	...	...	...	...	...	1	...	...	...	...	...	...	...
6	7	8	9	10	11	12	4	5	6	7	8	9	10
13	14	15	16	17	18	19	11	12	13	14	15	16	17
20	21	22	23	24	25	26	18	19	20	21	22	23	24
27	28	29	30	31	...	...	25	26	27	28	29	30	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
JUNE							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
...	...	...	...	...	...	1	...	...	...	...	...	...	...
3	4	5	6	7	8	9	...	...	...	...	...	...	...
10	11	12	13	14	15	16	9	10	11	12	13	14	15
17	18	19	20	21	22	23	16	17	18	19	20	21	22
24	25	26	27	28	29	30	23	24	25	26	27	28	29
...	...	...	...	...	...	...	30	31	...	...	...	...	...

Engineering Practice Periods for Division A indicated by type thus: 1 2 3.  
Engineering Practice Periods for Division B indicated by type thus: 1 2 3.  
Sundays and Holidays indicated by type thus: 1 2 3.

## CALENDAR, 1922-1923

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### General Notes

Division B is at Engineering Practice while Division A is at school.

Division A is at Engineering Practice while Division B is at school.

Periods at school or at Engineering Practice are shown by different kinds of type on Yearly Calendars.

First-year students co-operate on the twenty-week plan.

Students above the first year co-operate on the five-week plan.

All Engineering Practice periods for upperclassmen are of five weeks' duration, except in summer, when one period for each division is six weeks.

All students while at Engineering Practice have no holidays except those regularly allowed by employing firms.

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### Special Notes for 1922

June 19-July 29 Division B at Engineering Practice.

July 31-September 9 Division A at Engineering Practice.

July 10-July 29 Summer Vacation for Division A.

July 31-August 19 Summer Vacation for Division B.

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## CALENDAR, 1922

January 2, Monday

Observance of New Year's Day (School exercises omitted)

January 19, Thursday

Entrance examinations

January 30, Monday

Third Period (Second Semester) begins for Division A Upperclassmen

Opening of First Semester for Division B Freshmen

February 22, Wednesday

Washington's Birthday (School exercises omitted)

March 6, Monday

Third Period (Second Semester) begins for Division B Upperclassmen

Second Period begins for Division B Freshmen

April 6-7-8, Thursday, Friday, Saturday

School exercises omitted

April 10, Monday

Fourth Period begins for Division A Upperclassmen

Third Period (Second Semester) begins for Division B Freshmen

April 17-18, Monday, Tuesday

School exercises omitted

## Calendar, 1922-1923

*(Continued)*

- April 19, Wednesday  
Patriot's Day (School exercises omitted)
- May 15, Monday  
Fourth Period begins for Division B
- May 29, Monday  
School exercises omitted
- May 30, Tuesday  
Memorial Day (School exercises omitted)
- June 15, Thursday  
Entrance examinations
- June 17, Saturday  
Bunker Hill Day (School exercises omitted)
- June 18, Sunday  
Baccalaureate Sermon
- June 19, Monday  
Summer Term begins for Division A Upperclassmen  
Summer Term begins for Division B Freshmen
- June 21, Wednesday  
Annual Commencement
- July 4, Tuesday  
Independence Day (School exercises omitted)
- August 21, Monday  
Summer Term begins for Division B Upperclassmen  
Summer Term begins for Division A Freshmen
- September 4, Monday  
Labor Day (School exercises omitted)
- September 7, Thursday  
Entrance examinations
- September 11, Monday  
Opening of the First Semester for Division A
- October 12, Thursday  
Columbus Day (School exercises omitted)
- October 16, Monday  
Opening of the First Semester for Division B Upperclassmen  
Second Period begins for Division A Freshmen
- November 20, Monday  
Second Period begins for Division A Upperclassmen  
Third Period (Second Semester) begins for Division A Freshmen
- November 30, Thursday  
Thanksgiving Day (School exercises omitted)
- December 22-26, Thursday-Monday, inclusive  
Christmas Recess
- December 27, Tuesday  
Second Period begins for Division B. Upperclassmen  
Fourth Period begins for Division A Freshmen

## Calendar, 1922-1923

*(Continued)*

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### Special Notes for 1923

June 18-July 28 Division B at Engineering Practice

July 30-September 8 Division A at Engineering Practice

July 9-July 28 Summer Vacations for Division A

July 30-August 18 Summer Vacations for Division B

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## CALENDAR, 1923

January 1, Monday

New Year's Day (School exercises omitted)

January 18, Thursday

Entrance Examinations

January 29, Monday

Opening of the First Semester for Division B Freshmen

Third Period (Second Semester) begins for Division A Upperclassmen

February 22, Thursday

Washington's Birthday (School exercises omitted)

March 5, Monday

Third Period (Second Semester) begins for Division B Upperclassmen

Second Period begins for Division B Freshmen

April 5, 6, 7, Thursday, Friday, Saturday

School exercises omitted

April 9, Monday

Fourth Period begins for Division A Upperclassmen

Third Period (Second Semester) begins for Division B Freshmen

April 19, Thursday

Patriot's Day (School exercises omitted)

April 20, 21 Friday, Saturday

School exercises omitted

May 14, Monday

Fourth Period begins for Division B

May 30, Wednesday

Memorial Day (School exercises omitted)

June 14, Thursday

Entrance Examinations

## Calendar, 1922-1923

*(Continued)*

June 17, Sunday  
Baccalaureate Sermon

June 18, Monday  
Observance of Bunker Hill Day (School exercises omitted)

June 19, Tuesday  
Summer Term begins for Division A Upperclassmen  
Summer Term begins for Division B Freshmen

June 20, Wednesday  
Annual Commencement

July 4, Wednesday  
Independence Day (School exercises omitted)

August 21, Tuesday  
Summer Term begins for Division B Upperclassmen  
Summer Term begins for Division A Freshmen

September 3, Monday  
Labor Day (School exercises omitted)

September 6, Thursday  
Entrance Examinations

September 10, Monday  
Opening of the First Semester for Division A

October 12, Friday  
Columbus Day (School exercises omitted)

October 13, Saturday  
School exercises omitted

October 15, Monday  
Opening of First Semester for Division B Upperclassmen  
Second Period begins for Division A Freshmen

November 19, Monday  
Second Period begins for Division A Upperclassmen  
Third Period (Second Semester) begins for Division A Freshmen

November 29, Thursday  
Thanksgiving Day (School exercises omitted)

December 24, Monday  
School exercises omitted

December 25, Tuesday  
Christmas Day (School exercises omitted)

December 26, Wednesday  
Second Period begins for Division B Upperclassmen  
Fourth Period begins for Division A Freshmen

# Northeastern College

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## The Trustees

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# Northeastern College

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## OFFICERS

FRANK PALMER SPEARE, LL.B., M.H.  
President of the College

GALEN DAVID LIGHT, A.B.  
General Assistant to the President and Secretary of the College

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## THE EXECUTIVE COUNCIL

FRANK PALMER SPEARE, LL.B., M.H.  
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Dean of the School of Engineering and the Evening Polytechnic School

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Assistant to the President and Dean of the School of Law

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Dean of the School of Commerce and Finance

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Regional Director

IRA ARTHUR FLINNER, A.B., A.M.  
Superintendent of Secondary Schools

FRED COLFAX SMITH, A.B., B.S.  
Director of Vocational Institute

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## \*STANDING COMMITTEES OF THE COUNCIL

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COMMITTEE ON CURRICULUMS  
Carl S. Ell, *Chairman*

COMMITTEE ON COMMENCEMENT  
Galen D. Light, *Chairman*

COMMITTEE ON CATALOGS  
Carl D. Smith, *Chairman*

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\*The President and Secretary are, *ex-officio*, members of all committees.

# Northeastern College

## SCHOOL OF ENGINEERING

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### FACULTY OF THE SCHOOL

CARL STEPHENS ELL, A.B., M.S., Dean 52 Clement Ave., West Roxbury  
*Professor of Civil Engineering*

#### PROFESSORS

HENRY BISSELL ALVORD, S.B. 32 Hollis St., South Weymouth  
*Professor of Civil Engineering*

GEORGE FRANCIS ASHLEY 163 Summer St., Somerville  
*Professor of Drawing*

JOSEPH ARTHUR COOLIDGE, S.B. 20 Martin St., Cambridge  
*Professor of Physics*

PEARL WHITEFIELD DURKEE, S.B. 39 Windsor St., Arlington  
*Professor of Electrical Measurements*

CARL STEPHENS ELL, A.B., M.S. 52 Clement Ave., West Roxbury  
*Professor of Civil Engineering*

WILLIAM LINCOLN SMITH, S.B. 4 Academy Lane, Concord  
*Professor of Electrical Engineering*

JOSEPH SPEAR, A.B. 141 Chiswick Road, Brighton  
*Professor of Mathematics*

JOSEPH WILLIAM ZELLER, S.B. West Newton, Mass.  
*Professor of Mechanical Engineering*

#### ASSISTANT PROFESSORS

PERCY FRANCIS BENEDICT, S.B. 491 Belmont St., Belmont  
*Assistant Professor of Administrative Engineering*

ALFRED JOHN FERRETTI, S.B. 92 Church St., Lynn  
*Assistant Professor of Mechanical Engineering*

GEORGE BLODGETT GEE, C.E. 17 Pine St., Belmont  
*Assistant Professor of Drawing*

HAROLD WESLEY MELVIN, A.B. 76 Standish Ave., Wollaston  
*Assistant Professor of English*

WINTHROP ELIOT NIGHTINGALE, A.B., S.B. 73 Hovey St., Watertown  
*Assistant Professor of Civil Engineering*

JOHN BUTLER PUGSLEY, A.B. 23 Hardy Ave., Watertown  
*Assistant Professor of Mathematics*

# Northeastern College

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## FACULTY OF THE SCHOOL

(Continued)

SAMUEL ABBOTT SMITH STRAHAN <i>Assistant Professor of Chemistry</i>	26 Hemenway St., Boston
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### INSTRUCTORS

CHESTER PACKARD BAKER, B.Ch.E. <i>Instructor in Chemical Engineering</i>	53 Wendell Ave., Brockton
CHESTER JAMES GINDER <i>Instructor in Civil Engineering</i>	23 Russell St., Everett
MAURICE ELMER GOODRIDGE, S.B. <i>Instructor in Administrative Engineering</i>	463 Lebanon St., Melrose
EMIL ANTON GRAMSTORFF, S.B. <i>Instructor in Mechanical Drawing</i>	Farmcrest Ave., Lexington
JAMES WARREN INGALLS, S.B., C.E. <i>Instructor in Civil Engineering</i>	63 Graves St., East Lynn
MADISON PETERS JEFFERY, A.B. <i>Instructor in English</i>	58 Glenwood St., Malden
ERNEST FRED PERKINS, S.B., M.S. <i>Instructor in Chemical Engineering</i>	153 East Emerson St., Melrose
ROLAND GUYER PORTER, B.E.E. <i>Instructor in Electrical Engineering</i>	317 Common St., Watertown
HENRY EDWARD RICHARDS, S.B. <i>Instructor in Electrical Engineering</i>	Lynnfield Center, Mass.
JOHN JAMES SINNETT <i>Instructor in Physical Training</i>	24 Bardwell St., Jamaica Plain
FREDERICK ARLINGTON STEARNS, S.B. <i>Instructor in Mechanical Engineering</i>	208 Grove St., Melrose

# Northeastern College

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## FACULTY OF THE SCHOOL

(Continued)

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THEODORE BENJAMIN BLISS <i>Assistant in Chemistry</i>	75 Prince St., Jamaica Plain
WILLIAM ROBERT CLARKE <i>Assistant in Physics</i>	216 So. Whittlesey Ave., Wallingford, Conn.
GORDON BYAM ELDRIDGE <i>Assistant in Chemistry</i>	Nine Acre Corner, Concord
ARTHUR EDWARD HARDING <i>Assistant in Civil Engineering</i>	111 Gainsborough St., Boston
EDWARD SNOW PARSONS <i>Assistant in Civil Engineering</i>	705 Washington St., Gloucester
ROBERT FLETCHER REED <i>Assistant in Physics</i>	Granville Ferry, Nova Scotia
CHARLES CLIFTON RUSSELL, JR. <i>Assistant in Electrical Engineering</i>	21 Eliot St., Quincy
HENRY PHILIP SHOPNECK <i>Assistant in Chemistry</i>	100 Woodward Ave., Dorchester
BENJAMIN LINCOLN SMITH <i>Assistant in Electrical Engineering</i>	4 Academy Lane, Concord
GEORGE HENRY WETMORE <i>Assistant in Physics</i>	15 Glendale St., Peabody

# Northeastern College

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## ADMINISTRATIVE OFFICERS OF THE SCHOOL OF ENGINEERING

CARL STEPHENS ELL, A.B., M.S. <i>Dean</i>	52 Clement Ave., West Roxbury
JOHN BUTLER PUGSLEY, A.B. <i>Registrar</i>	23 Hardy Ave., Watertown
WINTHROP ELIOT NIGHTINGALE, A.B., S.B. <i>Director of Engineering Practice</i>	73 Hovey St., Watertown
JOSEPH SPEAR, A.B. <i>Director of Student Activities</i>	141 Chiswick Road, Brighton
HAROLD WESLEY MELVIN, A.B. <i>Director of Student Publications</i>	76 Standish Ave., Wollaston
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CHESTER JAMES GINDER <i>Assistant to the Dean</i>	23 Russell St., Everett

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BESSIE FREETHEY ALLEN <i>Bookkeeper</i>	268 Brookline Ave., Boston
ANNIE LAURIE CORBETT <i>Secretary to the Dean</i>	88 Melrose St., Melrose Highlands
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JESSIE MARY PAINE <i>Secretary to the Registrar</i>	91 Perkins St., East Somerville
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ELLEN MARGARET PORTER WHITEHOUSE, <i>Assistant to the Bursar</i>	66 Everett St., Arlington

# Northeastern College

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## DEPARTMENTS OF THE SCHOOL

### MAIN DEPARTMENTS

#### SCHOOL ADMINISTRATION

*Professor Pugsley, in charge*

#### ENGINEERING PRACTICE

*Professor Nightingale, in charge*

#### STUDENT ACTIVITIES

*Professor Spear, in charge*

### PROFESSIONAL DEPARTMENTS

#### CIVIL ENGINEERING

*Professor Alvord, in charge*

#### MECHANICAL ENGINEERING

*Professor Zeller, in charge*

#### ELECTRICAL ENGINEERING

*Professor Smith, in charge*

#### CHEMICAL ENGINEERING

*Professor Strahan, in charge*

### GENERAL DEPARTMENTS

#### DRAWING

*Professor Ashley in charge,*

#### ENGLISH

*Professor Melvin, in charge*

#### MATHEMATICS

*Professor Spear, in charge*

#### PHYSICS

*Professor Coolidge, in charge*

# Northeastern College

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## \*COMMITTEES OF THE FACULTY

1922-1923

### EXECUTIVE COMMITTEE

DEAN ELL, *Chairman*

PROFESSOR PUGSLEY

PROFESSOR NIGHTINGALE

PROFESSOR SPEAR

### ADMISSION

DEAN ELL, *Chairman*

PROFESSOR PUGSLEY

PROFESSOR MELVIN

### SCHOLARSHIP

PROFESSOR PUGSLEY, *Chairman*

PROFESSOR COOLIDGE

PROFESSOR SMITH

PROFESSOR NIGHTINGALE

PROFESSOR SPEAR

### ENGINEERING PRACTICE

PROFESSOR NIGHTINGALE, *Chairman*

PROFESSOR ALVORD

PROFESSOR STRAHAN

PROFESSOR SMITH

PROFESSOR ZELLER

### ATHLETICS

PROFESSOR SPEAR, *Chairman*

PROFESSOR PUGSLEY

PROFESSOR ZELLER

MR. JEFFERY

MR. PORTER

### FRATERNITIES

PROFESSOR ASHLEY, *Chairman*

PROFESSOR DURKEE

PROFESSOR BENEDICT

PROFESSOR FERRETTI

PROFESSOR MELVIN

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\*The Dean is, *ex-officio*, a member of all standing committees.

# Northeastern College

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## SPECIAL LECTURERS

JOE MITCHELL CHAPPLE

Editor of the *National Magazine*

"A Man and His Job"

HENRY H. CRANE

Rector of Center Methodist Episcopal Church, Malden, Mass.

"Four Things"

CHARLES W. ELIOT

President Emeritus of Harvard University

"A Useful and Enjoyable Life"

EDWIN H. HUGHES

Bishop, Methodist Episcopal Church, Boston Area

"Money and Education"

EDWARD L. LOGAN

Lawyer

"Civic Responsibilities"

LEMUEL H. MURLIN

President of Boston University

"Theodore Roosevelt"

ROBERT H. NEWCOMB

Executive's Assistant, Boston & Maine Railroad

"Defective Foundations"

PAYSON SMITH

State Commissioner of Education

"Productive Education"

FRANK P. SPEARE

President of Northeastern College

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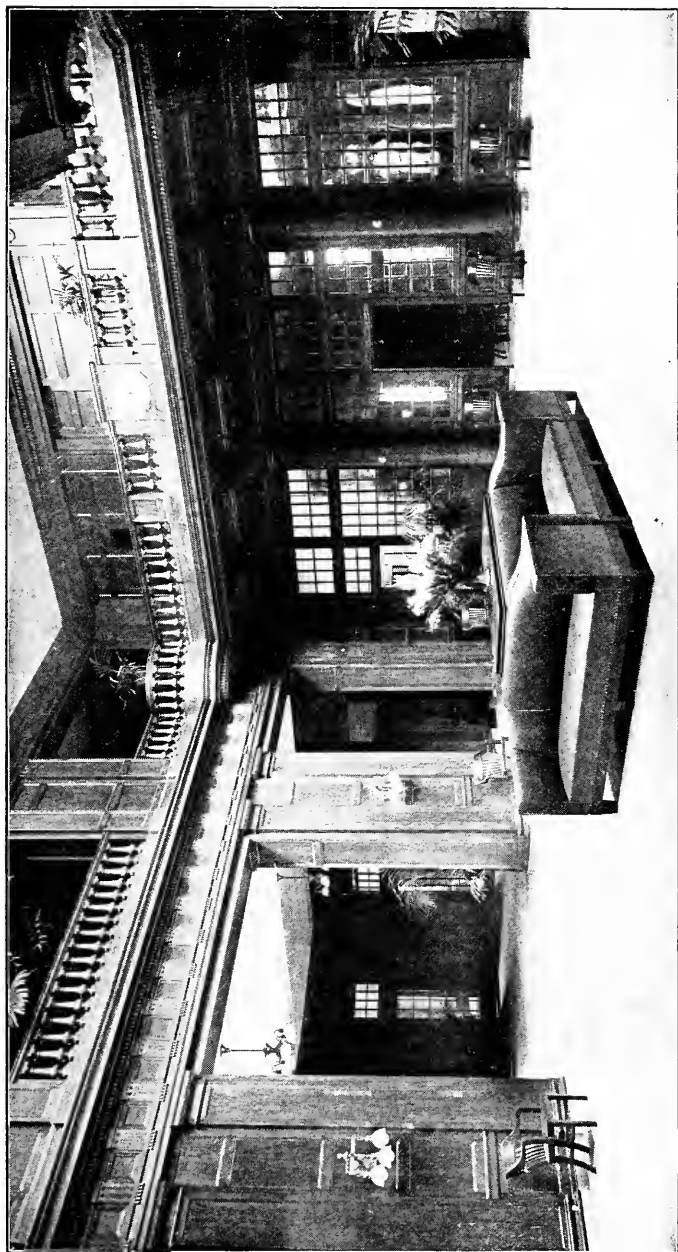
Surgeon

"The Human Brain"

RALPH B. WILSON

Director of Service for Babson's Statistical Organization

"Business Conditions"

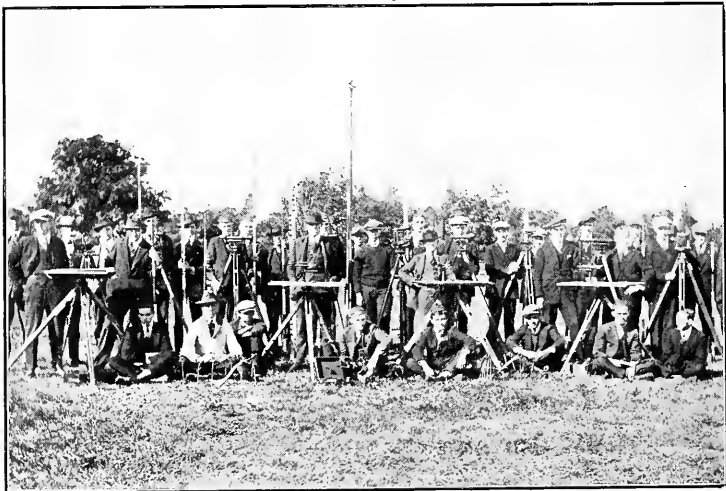


THE LOBBY

## Students in Class Work



Class in Mechanical Drawing  
NORTHEASTERN COLLEGE



Class in Surveying Fieldwork  
NORTHEASTERN COLLEGE

## GENERAL INFORMATION

### History of Northeastern College

The incorporation of Northeastern College of the Boston Young Men's Christian Association in March, 1916, marked the culmination of a notable development. The College is not a new institution, but the realization of an ideal carefully worked out and persistently followed for a period of many years.

The Boston Young Men's Christian Association, established in 1851, had, as one of its first lines of endeavor, evening classes for young men. It was not, however, until 1896 that the evening school system was placed upon a permanent basis with expert supervision. As courses were being offered in increasingly large numbers, it became evident that a more complete organization should be effected, with the result that the courses were grouped as separate schools, such additional courses being offered as would complete the curriculums of the several schools.

The School of Law, established in 1898, was incorporated in 1904 with degree granting power. The School of Commerce and Finance, founded in 1907, was incorporated in 1911, with the right to grant the Bachelor and Master of Commercial Science degrees. The School of Engineering was opened in 1909, and received in 1920 the right to grant the following degrees: Bachelor of Civil Engineering, Bachelor of Mechanical Engineering, Bachelor of Electrical Engineering, and Bachelor of Chemical Engineering. Affiliated with the College are the Evening Polytechnic School, the Huntington School for Boys, and the Northeastern Preparatory School.

In the thirteen years that have elapsed, the school, which was started with no special educational requirements for entering students, and which had but little equipment and a registration of only eight pupils, has grown to be a recognized factor in the community, with rigid requirements of scholarship and character for entering students, thousands of dollars' worth of equipment, a highly-trained and able faculty, and an enrollment of over eight hundred students. It is enabling the young man of moderate financial ability to get a college engineering training and at the same time not only to defray

## SCHOOL OF ENGINEERING

his own expenses, but also to become familiar with the actual practice of his profession.

### Object of the School

Technical school instruction, depending on class-room work and laboratories, must always lack some of the vital characteristics of an actual manufacturing plant. One is carried on for educational purposes, while the other is operated for dividends. It is this latter fact that gives the co-operative school idea one great advantage over the usual educational plan. Instead of training the student for several years for work in which he may later find himself entirely unfitted, the School puts the student to work in a commercial plant. There he learns life in its vital issues, as well as the problem of getting along with men, thus early finding out whether he has made a wise or unwise choice of his life work. This training shows him the use and value of his school work, and finally gives him an unusual opportunity to acquire from actual experience that rare characteristic, *executive ability*, without which his life probably would be spent on the lower levels of industry.

The fundamental aim of this School is to give young men sound training in both the theoretical and practical principles upon which professional practice is based. Thus they are enabled to advance farther and more rapidly in their chosen work than they could expect to do without further education than that of a high-school course. The training is not in any sense that of a trade school, but is that of a regular engineering school of high standards.

The School offers five branches of engineering: civil, mechanical, electrical, chemical, and administrative. The end sought is to give to students who have already had a high-school preparation, or its equivalent, a good training in the fundamental sciences of mathematics, chemistry, and physics, and in the important applications of the principles of these sciences to the several branches of engineering. Much stress is laid on the development of the ability to apply the acquired knowledge to new engineering problems, and an effort is made to be thorough without leading the student through a maze of mere mental gymnastics.

## GENERAL INFORMATION

The program of studies differs from that of many schools, in that a student is not permitted a wide range of subjects from which to choose. It has been found that better results are obtained by prescribing the principal studies which the student is to pursue.

### **Plan of Operation of the School**

To illustrate the plan of operation of the School, let us take the case of two men, "A" and "B" who desire to take any one of the various courses offered.

If the men are members of any one of the three upper classes (sophomore, junior, or senior), "B" will be assigned to one of the plants of a firm that is co-operating with the School. Here he receives his practical experience by actual work under School supervision for a period of five weeks. "A" who is called the alternate of "B" has meanwhile been attending classes at the School. At the end of the five-week period, "B" and "A" change places, that is, "B" takes the place of "A" at School, while "A" relieves his alternate at the plant of the employing firm. This process is repeated each period, these same two students alternating on the same job for at least one calendar year.

In the case of freshmen students, the alternating period is of twenty weeks' duration and the practical work is not necessarily of an engineering character. Division B freshmen will ordinarily continue with such employment as they may obtain for themselves up to the time of admission to the class rooms. Division A freshmen will be allowed to assume during their working period any kind of employment that will give promise of best remuneration. With either division, however, the students will be expected, when so advised by the Engineering Practice Department, to take Engineering Practice jobs where the nature of the work does not require any particular previous training.

### **Relation of School to High Schools**

This School is peculiarly adapted to the high school graduate with limited financial resources who still has the ambition and ability to get ahead if given the opportunity.

This year the school has a student body made up of graduates of the following schools:

## SCHOOL OF ENGINEERING

Abington High School	Clinton High School
Alton (N. H.) High School	Cohasset High School
Amherst High School	High School of Commerce
Amesbury High School	Colby (N. H.) Academy
Annapolis Royal Academy	Concord (Mass.) High School
(Granville Ferry, Nova Scotia)	Concord (N. H.) High School
Anson (Me.) Academy	Conway High School
Arlington High School	Cony High School
Ashland High School	(Augusta, Me.)
Athol High School	Cranston (R. I.) High School
Attleboro High School	Dalton High School
Avon High School	Danvers High School
Ayer High School	Dean Academy
Baddeck High School	Dedham High School
(Sidney, Nova Scotia)	Deep River (Conn.) High School
Bangor (Me.) High School	Deering (Me.) High School
Bar Harbor (Me.) High School	Dexter (Me.) High School
Bartlett High School (Webster)	Dorchester High School
Beezajian School (Constantinople,	Drury High School
Turkey)	Dummer Academy
Belfast (Me.) High School	Duxbury High School
Bellows Falls High School	East Boston High School
Belmont High School	East Bridgewater High School
Berkeley Preparatory School	East Towers (Mich.) High School
Berlin (N. H.) High School	Eastport (Me.) High School
Berwick (Me.) Academy	Enfield High School
Beverly High School	(Thompsonville, Conn.)
Boothbay Harbor (Me.) High	English High School
School	Essex County Agricultural School
Boston College High School	Essex (Mass.) High School
Boston Latin High School	Essex (Vt.) High School
Bourne High School	Everett High School
Braintree High School	Exeter (N. H.) High School
Brewster Free Academy	Fair Haven (Vt.) High School
(Wolfeboro, N. H.)	Fairhaven (Mass.) High School
Bridgeport (Conn.) High School	Fall River High School
Bridgewater High School	Fitchburg High School
Brighton High School	Foxboro High School
Bristol (Conn.) High School	Framingham High School
Bristol (Me.) High School	Franklin (Mass.) High School
Brockton High School	Franklin (N. H.) High School
Brookfield High School	Freeport (Me.) High School
Brookline High School	Fryeburg (Me.) Academy
Brunswick (Me.) High School	Gardner High School
Burlington (Vt.) High School	Georgetown High School
Calais (Me.) Academy	Gilman (Me.) High School
Cambridge Latin High School	Gloucester High School
Canaan (Vt.) High School	Gould's Academy (Bethel, Me.)
Canton High School	Greenfield High School
Central High School	Groton High School
(San Juan, Porto Rico)	Groveland High School
Chelmsford High School	Hallowell (Me.) High School
Chelsea High School	Hanover High School
Chester High School	Hardwick (Vt.) Academy
Chicopee High School	Hartford (Conn.) High School

## GENERAL INFORMATION

Haverhill High School	Meriden (Conn.) High School
Hingham High School	Mexico (Me.) High School
Holbrook High School	Middlebury (Vt.) High School
Holden High School	Middletown (Conn.) High School
Holliston High School	Milbridge (Me.) High School
Holyoke High School	Milford High School
Hopedale High School	Milton High School
Horblitt Preparatory School	Monson Academy
Hudson High School	Montpelier (Vt.) Seminary
Huntington School	Montpelier (Vt.) High School
Hyde Park High School	Murdock High School
Island Pond (Vt.) High School	Mt. Hermon School
Jonesport (Me.) High School	Nantucket High School
Keene (N. H.) High School	Nashua (N. H.) High School
Kennebunk (Me.) High School	Natick High School
Kimball High School	Needham High School
Kimball Union (N. H.) Academy	New Britain (Conn.) High School
Kingston High School	New Gloucester (Me.) High School
South Kingston (R. I.) High School	New London (Conn.) High School
Laconia (N. H.) High School	Newburyport High School
Lancaster High School	Newton High School
LaSalle (R. I.) Academy	Newton Vocational School
Lausitz High School (Germany)	North Attleboro High School
Lawrence High School	North Berwick (Me.) High School
Lee High School	Northeastern Secondary School
Leicester High School	Norton High School
Lewis (Conn.) High School	Norwell High School
Lewis & Clark High School	Norwood High School
(Washington)	Nute (N. H.) High School
Lewiston (Me.) High School	Orange High School
Lexington High School	Pawtucket High School
Littleboro High School	Peabody High School
Livermore Falls (Me.) High School	Petersham High School
Los Angeles (Cal.) High School	Petrograd Technical School
Lowell High School	(Petrograd, Russia)
Lubec (Me.) High School	Phillips Exeter Academy (N. H.)
Lyman Hall (Conn.) High School	Pittsfield High School
Lynn Classical High School	Plainfield (Conn.) High School
Lynn English High School	Plainfield (Mass.) High School
Madison (Me.) High School	Plymouth High School
Maine Central Institute (Me.)	Portland (Me.) High School
Malden High School	Portsmouth (N. H.) High School
Manchester (Mass.) High School	Pratt (Conn.) High School
Manchester (N. H.) High School	Proctor (Vt.) High School
Mansfield High School	Providence Technical High School
Marblehead High School	Provincetown High School
Marlboro High School	Putnam (Conn.) High School
Marshfield High School	Quincy High School
Maynard High School	Reading High School
McKinley (D. C.) High School	Revere High School
Mechanic Arts High School	Richards (N. H.) High School
Medfield High School	Richford (Vt.) High School
Medford High School	Rindge Technical High School
Medway High School	Rochester (N. H.) High School
Melrose High School	Rochester (N. Y.) High School

## SCHOOL OF ENGINEERING

Rockland High School	Townshend (Vt.) High School
Rumford (Me.) High School	Traip (Me.) Academy
Sacred Heart High School (R. I.)	Upton High School
Salem High School	Vinalhaven (Me.) High School
Sanderson Academy	Wakefield High School
Sanford (Me.) High School	Walpole High School
Saugus High School	Waltham High School
Schuylerville (N. Y.) High School	Wareham High School
Scituate High School	Waterbury (Vt.) High School
Sharon High School	Watertown High School
Shrewsbury High School	Wellesley High School
Simsbury (Conn.) High School	West Hartford (Conn.) High School
Skowhegan (Me.) High School	West Roxbury High School
Solon (Me.) High School	West Springfield High School
Somerset High School	Westbrook (Me.) Seminary
Somersworth (N. H.) High School	Westfield High School
Somerville High School	Westinghouse High School
South Boston High School	Weymouth High School
Springfield Technical High School	Whitman High School
Springfield Central High School	Williamstown High School
Stephens (Me.) High School	Williston Seminary
Stevens (N. H.) High School	Wilmington High School
Stoneham High School	Wilton (N. H.) High School
Stonington (Conn.) High School	Windham (Conn.) High School
Stoughton High School	Windsor (Vt.) High School
Stowe High School	Winthrop High School
Strong (Me.) High School	Woburn High School
Sudbury High School	Woodstock (Conn.) Academy
Sutton High School	Woodstock (Vt.) High School
Swampscott High School	Woodsville (N. H.) High School
Taunton High School	Worcester Classical High School
Templeton High School	Worcester Commercial High School
Thayer Academy	Worcester South High School
Thompson High School (Conn.)	Worcester Trade School
Tilton (N. H.) Seminary	York (Me.) High School
Torrington (Conn.) High School	

## *EQUIPMENT OF THE SCHOOL*

### **ENGINEERING EQUIPMENT**

#### **Field Instruments of Civil Engineering**

For work in the field, the Civil Engineering Department possesses various surveying instruments, representing the principal makes and types in general use. The equipment includes two Keuffel & Esser transits, two Buff & Buff transits, two Berger levels, two other levels, and three plane table outfits. There are Locke hand levels, flag poles, leveling rods, stadia rods, engineers' and surveyors' chains, steel and cloth tapes, and all the miscellaneous equipment necessary to outfit the parties that the instruments will accommodate. The transits are equipped with neutral glasses and reflectors for astronomical observations. For higher surveying there is an aneroid barometer for barometric leveling, a sextant for hydrographic surveying, and a Gurley electric current meter for hydraulic measurements.

The extent of the equipment and scope of the field work itself are designed to train the student's judgment as to the relative merits of the various types of field instruments.

#### **Mechanical Laboratories**

The steam power plant is completely equipped with meters, scales, indicators, Orsat apparatus, one CO<sub>2</sub> recorder, and all other equipment necessary for making complete power plant tests. The plant consists of four horizontal-return tubular boilers, two of which are equipped for burning fuel oil and two for burning coal; and four three wire generators, of which three are driven by Ridgway reciprocating steam engines of various sizes, and the other is direct connected to a Westinghouse-Parsons turbine. This places at the disposal of our classes a well-equipped, up-to-date engineering laboratory, and gives them the means of carrying on boiler tests, determining the efficiencies of various fuels and oils, taking indicator diagrams, determining the efficiency of modern reciprocating engines and turbines when direct connected to generators, as well as renders them familiar with all the various auxiliary appliances of such a plant, as separators, pumps, air compressors. Apparatus is also available for slide valve setting, gauge testing, measuring flow of air, steam, and water, and Prony brake testing.

## *SCHOOL OF ENGINEERING*

### **Electrical Measurements Laboratory**

The laboratory was entirely rebuilt during the summer of 1920. It is equipped with apparatus fundamentally planned for teaching the principles of measurement, rather than for the precise determination of quantitative results. Nevertheless it is necessary for the proper performance of work in the other laboratory courses that a certain amount of careful quantitative work should be done, and the equipment is being steadily increased and developed with both ends held in view.

A partial list of the apparatus available for instruction is the following. Under the first head, resistance by Ohm's law, substitution and direct reflection, voltmeter methods for high resistance, insulation resistance, specific resistance, slide wire bridge, electrostatic capacity, inductance, Poggendorf's method of E. M. F. comparison. Under the second head, a Laboratory standard Wheatstone bridge, a Kelvin low resistance bridge, a Leeds Northrup potentiometer with two standard Weston cells, volt box and steady source of high voltage for voltmeter calibration, a commutator, and leads for use with the Carey-Foster method, and a chemical balance.

The instrument room is supplied with 18 high-grade G. E. and Weston ammeters and voltmeters of various sizes for D. C. work, together with numerous similar instruments of cheaper quality for lower class work.

For A. C. testing, there are 27 voltmeters and ammeters of various sizes arranged in groups of three for polyphase work, and 8 single or three phase wattmeters.

There is also a considerable amount of auxiliary apparatus such as frequency indicators, synchroscopes, and power factor meters.

### **Electrical Engineering Laboratory**

The Laboratory was entirely remodeled during the summer of 1920. It is equipped with numerous machines of different types, the size and voltage ratings being selected to reduce as much as possible the risk from large voltage and power apparatus, while at the same time making available to the student commercial apparatus such that the various quantities it is desired to measure will be of reasonable dimensions.

## *EQUIPMENT OF THE SCHOOL*

Moderate-sized machines are used principally for this reason, but also because the students in their Engineering Practice come into contact with the large-sized and varied machinery of modern power houses and electrical plants generally.

Among the machines of this department are a pair of matched Holtzer-Cabot 5 kv-a synchronous converters, specially planned to operate as 3 phase generators, motors, or double current generators. They are driven independently by 10 HP 220-volt General Electric interpole motors, and may also be mechanically coupled for certain work.

There is also a pair of matched and specially designed direct current generators of 6 kilowatt rating at 220 volts, which may be operated either shunt or compound, driven by a 15 kilowatt interpole Sprague motor with double extended shaft. These machines are particularly intended for work on characteristics and parallel operation, but may also be coupled so as to be available in the various "pumping back" methods of testing.

Alternating current is supplied by a three phase General Electric 15 kv-a alternator, giving practically a pure sine wave, driven by a 20 kw Westinghouse motor; there is also a 7.5 kv-a General Electric alternator driven from a 15 HP Sprague motor, fitted with taps from each armature coil, a 5 kv-a Holtzer-Cabot machine with two spare rotors, making it available either as a generator, synchronous motor, squirrel cage or phase wound induction motor; and a dozen or so more motors and generators of various sizes and types.

There are two sets of G. E. type H transformers, three to the set, of 3 kv-a rating with primary voltage of 550 and secondary of 220-110, which may be used for transmission experiments as well as ordinary testing, and a very considerable assortment of variable ratio transformers, reactances, condensers, and similar control and testing apparatus aside from the very complete line of instruments belonging to the Electrical Measurements Laboratory.

### **Chemical Laboratories**

The School has three laboratories completely equipped in all respects for carrying on all lines of chemical work, from

## *SCHOOL OF ENGINEERING*

that of a high school to that of most advanced college grade. They have accommodations for over one hundred and fifty students, and are suitably furnished with all the necessary appliances for chemical work. Some of these are: hoods, drying closets, a still, steam and hot water baths, electrolytic circuits, vacuum and pressure apparatus, balances, combustion furnaces, and complete sets of apparatus for the sampling and analysis of flue gases and fuels. There are also testing machines for oils, viscosimeters, and different sorts of flash point apparatus. A chemical museum is connected with this department where are kept specimens for purposes of illustration.

### **Design and Drafting Rooms**

The School possesses large, light, and well-equipped drawing rooms for the carrying on of the designing and drafting which form so important a part of engineering work. These rooms are supplied with lockers containing the drawing supplies, and files containing blue prints, and photographs of machines and structures that represent the best practice.

### **Physics Laboratories**

The Physics Department has two large laboratories completely equipped with all necessary apparatus for the experimental work that is required of the students, as well as that required for lecture demonstration. The apparatus and equipment includes verniers, levels, vacuum pump, planimeters, spherometers, calorimeters, thermometers, pyrometer, sonometer, spectroscope, spectrometer, balances, standard gram weight, lecture table galvanometer, optical disk with all accessories, lenses, photometer, air thermometer, and a full set of weather bureau apparatus, including barograph, thermograph, hygrometer, barometer, maximum and minimum thermometers, etc. These give a wide range to the experimental work that can be done.

### **Libraries**

Students of the School have available for their use the general library of the Association, which includes, for their exclusive use, a large collection of engineering texts, refer-

## *EQUIPMENT OF THE SCHOOL*

ence books, and current periodicals on engineering and scientific subjects.

In addition, all members of the School have the privilege of taking books from the Boston Public Library, which offers a very unusual opportunity to our non-resident students. The School is within easy access to the Public Library, which enables students to have unlimited reference to engineering subjects at any time.

### **Department of Physical Training**

Northeastern has exceptional facilities for all-round physical training. The gymnasium with its 12-lap running track, three basketball courts, wrestling, boxing, fencing and special exercise rooms, handball courts and bowling alleys, is one of the most complete in New England. The natatorium is one of the best in the country. It is in a separate building, having a glass roof, admitting abundant sunlight, and has a continuous supply of filtered salt water. The tank is 75 feet long and 25 feet wide. Adjoining the building is a large field equipped for athletics. Here are four tennis courts, outdoor gymnasium, basketball court, jumping pits and a track with a 100-yard straightaway; baseball and football fields. Inter-class contests are arranged in basketball, baseball, tennis, indoor and outdoor athletics, and swimming. Intercollegiate games and meets are arranged with the leading colleges in the East.

## **ENGINEERING PRACTICE**

### **Correlation of Practical and Theoretical Work**

The employers who co-operate with us agree, where practicable, to employ the students in all the different departments of their establishments during their periods of engineering practice. This training is just as complete as the school work, and is just as thorough. Where possible, the course of the student is from the handling of the raw material to the shipment of the finished product. This practical training includes the use of the machines, as well as the executive duties of the plant, so that at the end of his course the graduate may not only know how to do things, but also why they are done in certain ways. Detailed reports are made by each student

## *SCHOOL OF ENGINEERING*

for each of his working periods. The subjects for these reports are chosen by the student and may be anything of importance in connection with his job. These reports are criticized and discussed when the student returns to school. Accurate records and grades are kept of the engineering practice of each student, and it is not possible to secure a degree unless this part of the course is completed successfully.

### **Number of Positions Available**

The number of positions at our disposal in any one branch of engineering is necessarily limited. Thus far we have secured desirable positions for our students as the growth of the School has demanded. Nevertheless, to be at all sure of work in his chosen branch of engineering, an applicant should file his application early.

Sometimes students may secure their own positions with firms, in which case an alternate can usually be furnished by the School, if desired. Such individual arrangements are entirely acceptable to the School, and may be made by any applicant, subject to the approval of the Director of Engineering Practice.

### **Attitude of Co-operating Firms**

The favorable attitude of the co-operating concerns toward our plan is shown by their retention of the same students from year to year, even after graduation, and also in the fact that whenever vacancies occur which can be filled by our men, the firms often apply for additional students to fill them. The men under whose supervision the students have been in their outside work are practically unanimous in approval of our plan, and speak highly of the enthusiasm, earnestness, and intelligence the students have shown in the performance of their duties.

### **Working Relations**

When a student is first assigned to a firm, the School gives him general information in regard to the work and a letter of introduction. At the first interview the student is expected to familiarize himself with the kind of work on which he is to be engaged while with the firm, and the conditions under which he is to work. It is expected that no student will

## ENGINEERING PRACTICE

accept employment through the school unless he can and will continue in School and with the firm in question throughout the year in accordance with the general plans of Engineering Practice. During the periods of Engineering Practice the students report for work at the regular working hours of the firm, no special privileges being granted. Students are not permitted to discontinue Engineering Practice except under unusual conditions and only by previous arrangements with the School. *In all cases of absences from Engineering Practice, whether unavoidable or not, the student or a member of his family is required to notify the employing firm by telephone immediately at or before the time of the occurrence of the absence.* This matter of notifying the employing firm immediately is very important. Failure to do so is sufficient cause for dismissal.

The School places the student at work with the employing firm and is responsible for his presence and conduct at work as well as the quality and scope of his work. All difficulties arising in regard to students who are in Engineering Practice are taken up with the School at the next following school period. *It is absolutely necessary that each student be prepared to fulfill his engineering practice obligations as faithfully during the summer months as at any other time,* and no student can ordinarily expect any longer vacation than the regular three weeks specified during the summer.

Students in the sophomore, junior, and senior years are almost invariably placed with firms which give them experience directly in line with the course of study followed at school.

Freshmen, as a rule, are assigned to work not so technical in character, but designed to train the younger men in the fundamental qualities of cheerfulness, dependability, enthusiasm, and grit. These attributes are essential to the successful completion of the upper class work. They are emphasized at every opportunity during the student's college life in connection with his engineering practice, and the first year's training is designed especially to develop these habits. If a young man can form habits of mental and physical alertness and reliability, he has laid a sure foundation for his success and happiness in after life. The detailed technical information and experience is added in the three upper years.

## SCHOOL OF ENGINEERING

In general, all changes and transfers in Engineering Practice are made at the beginning of the school year in September.

### Earnings

The firms treat our students as they do their other employees in manner of payment, rates of pay, chances for promotions, etc. Each firm makes individual arrangements with the student, and the School does not attempt to supervise except for occasional consultations with the employers over general policies.

*The rates of pay for students in the School are kept low so that the employer feels justified in devoting time to the instruction of the students and in transferring students from one department to another at approximately regular intervals.*

By agreement with the co-operating firms the following minimum wages are paid to students:

- \$10 per week for the first school year.
- 12 per week for the second school year.
- 14 per week for the third school year.
- 16 per week for the fourth school year.

Ordinarily a student starts with each firm at the minimum wage and is promoted as his ability may warrant. In certain cases the students receive less than the minimum stated above, but this is usually made up to them in some other way.

No upper limit of wages is set. The average maximum is \$18 to \$20 even for men of exceptional ability, because the students are given the privilege of attending school on the co-operative plan and of being transferred from one department to another. The sum earned is more than enough to pay the tuition and the necessary expenses of schooling, but does not cover the cost of living.

### Schedules of Practical Work

Below are typical schedules of practical work that have been prepared for our students by some of the companies which are giving them employment:

#### **Boston & Maine Railroad Co.**

ONE YEAR	Erecting Dept.
ONE YEAR	Machine Dept.
ONE YEAR	Machine Dept.
ONE YEAR	Erecting Dept.
	Drafting Room

## ENGINEERING PRACTICE

### Simplex Wire & Cable Co.

- ONE YEAR Insulating Dept.  
Braiding Dept.
- ONE YEAR Cable Shop  
Twisting Dept.
- ONE YEAR Machine Shop Construction Gang  
Electrical Construction Gang
- ONE YEAR Testing Room

### The Dennison Manufacturing Co.

- ONE YEAR Carpenter's Helper  
Pattern Maker's Helper and Case Making  
Mill-wright Work and Elevator, Fire Door Inspection  
Helper in Electrical Dept.
- ONE YEAR Machine Shop Stock Room  
Machine Shop  
Machine Shop  
Grinding Room
- ONE YEAR Power Plant Work  
Accident Prevention Work  
Filing Plans, Blue Prints, Tracing, Etc.  
Planning Dept. Work
- ONE YEAR Tracing and General Work  
Detailing and General Drafting

### Crofoot Gear Works

- ONE YEAR Inspection Dept.  
Finishing Dept.
- ONE YEAR Hobbing Dept.  
Cutting Dept.
- ONE YEAR General Grinding Dept.  
Tool Making

### Simplex Electric Heating Co.

- ONE YEAR Machine Dept.
- ONE YEAR Grinding Dept.  
Stock Dept.  
Winding Dept.  
Enameling Dept.  
Assembling Dept.
- ONE YEAR Testing Dept. First Division  
Testing Dept. Second Division
- ONE YEAR Shipping Dept.  
Drafting Dept.  
General Shop Experience

### Boston & Albany Railroad Co.

- ONE YEAR Work in Field Party
- ONE YEAR Work in Drafting Room
- ONE YEAR Masonry Inspection  
General Railroad Work  
Railroad Accounting
- ONE YEAR Railroad Accounting  
Timekeeping and Unit Costs

## SCHOOL OF ENGINEERING

### Condit Electrical Manufacturing Co.

ONE YEAR	Testing D. C. Apparatus
	Testing A. C. Apparatus
ONE YEAR	Switchboard
	Construction
	Installation
ONE YEAR	Blue Printing
	Drafting
ONE YEAR	Engineering
	Engineering Specifications

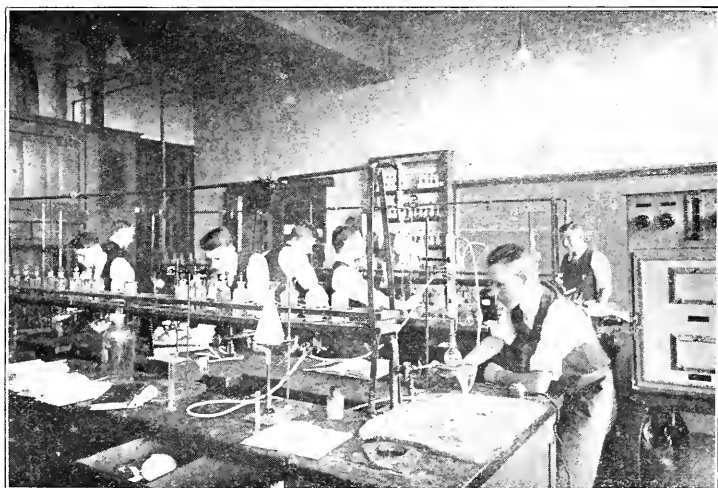
### Co-operating Firms

ABERTHAW CONSTRUCTION COMPANY, Boston (Civil)  
ACME APPARATUS COMPANY, Cambridge (Electrical)  
AMERICAN ACID COMPANY, Medford (Chemical)  
AMERICAN AGRICULTURAL CHEMICAL COMPANY, Everett (Chemical)  
AMERICAN GLUE COMPANY, Peabody (Electrical)  
AMERICAN RADIO & RESEARCH CORPORATION, Medford Hillside (Electrical)  
AMERICAN STEAM GAUGE & VALVE COMPANY, Boston (Mechanical)  
APPLETON, THOMAS A., Civil Engineer, Salem (Civil)  
ARLINGTON FOUNDRY, Arlington (Chemical and Mechanical)  
ARNOLD MACHINE SHOP, Rockland (Mechanical)  
ASPINWALL & LINCOLN, Civil Engineers, Boston (Civil)  
BARNES, ROWLAND H., Civil Engineer, Waltham (Civil)  
BATES, WALTER C., Surveyor, Jamaica Plain (Civil)  
BEACON OIL COMPANY, Everett (Chemical)  
BETHLEHEM SHIPBUILDING CORPORATION, Quincy (Civil, Mechanical, Electrical)  
BLANCHARD MACHINE COMPANY, Cambridge (Mechanical)  
BOSTON & ALBANY RAILROAD, Boston (Civil)  
BOSTON CONSOLIDATED GAS COMPANY, Boston (Chemical)  
BOSTON FUEL TESTING COMPANY, Boston (Chemical)  
BOSTON INDIA RUBBER COMPANY, Boston (Chemical)  
BOSTON & MAINE RAILROAD, Boston (Mechanical and Civil)  
BOSTON UNIVERSITY-LABORATORY, Boston (Chemical)  
BOSTON VARNISH COMPANY, East Everett (Chemical)  
BOSTON WOVEN HOSE & RUBBER COMPANY, Cambridge (Mechanical, Chemical, Administrative)  
BRACKETT, L. G., Civil Engineer, Boston (Civil)  
BROADWAY IRON FOUNDRY, Cambridge (Mechanical)  
BUFF & BUFF MANUFACTURING COMPANY, Jamaica Plain (Civil, Mechanical)  
BUTT, H. G., MANUFACTURING COMPANY, Boston (Mechanical)  
CADILLAC AUTOMOBILE COMPANY, Boston (Mechanical)  
CAMBRIDGE RUBBER COMPANY, Cambridge (Electrical)  
CHASE-SHAWMUT COMPANY, Newburyport (Electrical)  
COFFIN VALVE COMPANY, Neponset (Mechanical)  
CONANT MACHINE COMPANY, Concord (Mechanical)  
CONDIT ELECTRICAL MANUFACTURING COMPANY, South Boston (Electrical)  
CRITTENDEN MANUFACTURING COMPANY, Jamaica Plain (Mechanical)  
CROCKER, H. S., City Engineer, Brockton (Civil)  
CROCKER PEN COMPANY, Everett (Mechanical)

## Students in Class Work



Class in Physics Laboratory  
NORTHEASTERN COLLEGE



Class in Organic Chemistry  
NORTHEASTERN COLLEGE

## Civil Engineering Students



Making a Plane Table Survey  
CLASS IN SURVEYING FIELDWORK



Levelling for Building Construction  
SIMPSON BROS. CORPORATION

## ENGINEERING PRACTICE

CROFOOT GEAR WORKS, Hyde Park (Mechanical)  
CROSBY STEAM GAGE & VALVE COMPANY, Charlestown (Mechanical)  
DENNISON MANUFACTURING COMPANY, Framingham (Mechanical and Electrical)  
DRISCOLL & COMPANY, Heating Contractors, Salem (Mechanical)  
EASTERN METAL & REFINING COMPANY, Malden (Mechanical)  
EASTMAN AND BRADFORD, Civil Engineers, Lynn (Civil)  
EDISON ELECTRIC ILLUMINATING COMPANY, Boston (Mechanical, Electrical, Chemical)  
ELECTRIC MAINTENANCE COMPANY, Boston (Electrical)  
ELLIOT, C. J., Civil Engineer, Boston (Civil)  
ELLIS MANUFACTURING COMPANY, Milldale, Conn. (Mechanical)  
EMERSON APPARATUS COMPANY, Melrose (Mechanical)  
EVANS, R., Essex County Engineer, Salem (Civil)  
FARNHAM, RALPH J., Civil Engineer, Wellesley (Civil)  
FULLER, GEORGE A., COMPANY, Boston (Civil)  
GANNETT, CHARLES H., Civil Engineer, Boston (Civil)  
GENERAL ELECTRIC COMPANY, Lynn (Mechanical, Electrical and Chemical)  
GLENLYON DYE WORKS, Saylesville, R. I. (Chemical)  
HOLTZER CABOT ELECTRIC COMPANY, Roxbury (Electrical)  
HOOD RUBBER COMPANY, Watertown (Mechanical)  
HOWE & FRENCH, Boston (Chemical)  
HUME BODY CORPORATION, Boston (Mechanical)  
HUMPHREY, C. B., Court Surveyor, Boston (Civil)  
HUNT-SPILLER MANUFACTURING COMPANY, South Boston (Chemical)  
HYGRADE LAMP COMPANY, Salem (Electrical)  
INDUSTRIAL ENGINEERING CORPORATION, Boston (Chemical)  
JAGER, CHARLES J., COMPANY, Boston (Mechanical)  
JENNEY ELECTRICAL MANUFACTURING COMPANY, Brockton (Electrical)  
JOY, C. F., JR., Town Engineer, Milton (Civil)  
KINNEY MANUFACTURING COMPANY, Jamaica Plain (Mechanical)  
KNOTT, L. E., APPARATUS COMPANY, Cambridge (Mechanical and Chemical)  
LANDERS, FRARY & CLARKE, New Britain, Conn. (Mechanical)  
LAWTON MILLS CORPORATION, Plainfield, Conn. (Mechanical)  
LEVER BROTHERS, Soap Manufacturers, Cambridge (Chemical)  
LEWIS, GREEN, McADAMS AND KNOWLAND, Cambridge (Chemical)  
LYNN, CITY OF, Water Dept. (Civil)  
MAINE STATE HIGHWAYS, Augusta, Maine (Civil)  
MALDEN & MELROSE GAS & ELECTRIC COMPANY, Malden (Electrical and Chemical)  
MANHASSETT MANUFACTURING COMPANY, Putnam, Conn. (Electrical)  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge (Chemical)  
MASSACHUSETTS PUBLIC WORKS DEPT., Division of Highways, Boston (Civil)  
MASSACHUSETTS PUBLIC WORKS DEPT., Testing Laboratory, Boston (Chemical)  
MCCLINTOCK & WOODFALL, Civil Engineers, Boston (Civil)  
MCLEWAIN, W. H., COMPANY, Manchester, N. H. (Mechanical)  
MCINTIRE, F. N., BRASS WORKS, Boston (Mechanical)  
MERCHANT, A. P., COMPANY, Boston (Electrical)  
MERRIMAC CHEMICAL COMPANY, North Woburn (Chemical)  
METAL GOODS MANUFACTURING COMPANY, INC., Boston (Mechanical and Electrical)

## SCHOOL OF ENGINEERING

MONKS AND JOHNSON, Structural Engineers, Boston (Civil)  
MORGAN CONSTRUCTION COMPANY, Worcester (Mechanical)  
MOSS ELECTRICAL COMPANY, Putnam, Conn. (Electrical)  
NEW ENGLAND COAL & COKE COMPANY, Everett (Chemical)  
NEW ENGLAND OIL REFINING COMPANY, Fall River, Mass. (Civil)  
NEW ENGLAND STRUCTURAL COMPANY, Everett (Mechanical)  
NEWTON CITY ENGINEER (Civil)  
NORFOLK IRON WORKS, Quincy (Civil)  
NORTHEASTERN COLLEGE LABORATORIES (Civil, Mechanical, Electrical and Chemical)  
NORWOOD TOWN ENGINEER (Civil)  
OLD COLONY FOUNDRY, East Bridgewater (Mechanical)  
OLD COLONY TOOL COMPANY, Taunton (Mechanical)  
PAVER'S MACHINE SHOP, Franklin (Mechanical)  
PLYMOUTH CORDAGE COMPANY, Plymouth (Mechanical)  
PLYMOUTH ELECTRIC LIGHT COMPANY, Plymouth (Electrical)  
PLYMOUTH TOWN ENGINEER (Civil)  
PNEUMATIC SCALE CORPORATION, Norfolk Downs (Mechanical)  
POTTER, HERBERT S., Electrical Contractor, Boston (Electrical)  
PORTLAND, MAINE, Department of Public Works (Civil)  
PUNCHARD, W. H., Landscape Architect, Boston (Civil)  
PUTNAM MACHINE COMPANY, Fitchburg (Mechanical)  
SANBORN COMPANY, Instrument Manufacturers, Boston (Mechanical and Electrical)  
SHERRY, FRANK E., Civil Engineer, Boston (Civil)  
SIMPLEX ELECTRIC HEATING COMPANY, Cambridge (Electrical)  
SIMPLEX WIRE AND CABLE COMPANY, Cambridge (Electrical)  
SIMPSON BROTHERS CORPORATION, Boston (Civil)  
SKINNER ORGAN COMPANY, Dorchester (Civil)  
SKINNER, SHERMAN & ESSELEN, Inc., Boston (Chemical)  
STARRET, L. S., TOOL COMPANY, Athol (Mechanical)  
STEVENS DURYEA COMPANY, Chicopee Falls (Mechanical and Electrical)  
STURTEVANT, B. F., COMPANY, Hyde Park (Mechanical and Electrical)  
TRIMONT MANUFACTURING COMPANY, Roxbury (Mechanical)  
TRUFANT, A. P., Civil Engineer, Brockton (Civil)  
TURNER CONSTRUCTION COMPANY, Boston (Civil)  
UNION SPINNING & PLATING COMPANY, Boston (Mechanical)  
UNITED ELECTRIC RAILWAYS COMPANY, Providence, R. I. (Mechanical and Electrical)  
UNITED SHOE MACHINERY COMPANY, Beverly (Mechanical and Electrical)  
UNITED STATES ENVELOPE COMPANY, Holyoke (Mechanical)  
VENNARD, WILLIAM L., City Engineer, Lynn (Civil)  
VICTOR SHOE MACHINERY COMPANY, Lynn (Mechanical)  
WALTHAM MOTOR MANUFACTURERS, Inc., Waltham (Mechanical)  
WALTHAM WATCH COMPANY, Waltham (Mechanical and Chemical)  
WARREN BROTHERS COMPANY, Paving Materials Laboratory, Cambridge (Chemical)  
WERBY LABORATORIES, Boston (Chemical)  
WESTINGHOUSE ELECTRIC MANUFACTURING COMPANY, Springfield (Electrical)  
WHITMAN AND HOWARD, Civil Engineers, Boston (Civil)  
WILLARD SERVICE STATION, South Framingham (Electrical)  
WOLLASTON FOUNDRY COMPANY, Norfolk Downs (Mechanical)  
WORCESTER ELECTRIC LIGHT COMPANY, Worcester (Mechanical and Electrical)

## REQUIREMENTS FOR ADMISSION

### General Statement

In general, the preparation necessary to enable an applicant to pursue successfully one of the regular curriculums in the School corresponds to the four-year course of study offered by high schools of the better grade. The requirements of age and scholarship are regarded as the minimum in all ordinary cases, and only exceptional circumstances will justify any relaxation. Parents and guardians are advised that it is generally for the ultimate advantage of the student not to enter under the age of sixteen years. Every applicant must furnish references as to his character and ability, and must show cause why he may reasonably be expected to make a success of his course, both in the School and in Engineering Practice. He must be willing and able to work hard, both mentally and physically.

### Admission to the First Year

Students are admitted to the first year in all curriculums at the opening of the first semester in September and at opening of the second semester in January. An applicant for admission as a regular student to the School is required to present evidence of graduation from an accredited four-year high school, or the equivalent, and to have included in his course of study algebra as far as quadratics and plane geometry. The completion of fifteen units of preparatory subjects satisfactory to the Committee on Admission is considered equivalent qualification. Students whose high school courses have not included the required algebra and plane geometry must take special entrance examinations, the dates of which are scheduled elsewhere in this catalog. Certificates of entrance examinations passed for admission to colleges, or technical schools of good standing, may be accepted in lieu of entrance examinations.

In exceptional cases a student who is not a high school graduate may be allowed to enter as a special student, but only after his case has been passed on favorably by the Committee on Admission. Every applicant is urged to remain in high school until he is graduated, even though he might be able to qualify for entrance before receiving his high school diploma.

## *SCHOOL OF ENGINEERING*

A student obtaining a low rating on his entrance examinations, or who may not be eligible to assignment to Engineering Practice for other reasons, may by special permission be allowed to attend school either every period or every alternate period. When a student's record justifies such a procedure, he may be assigned to Engineering Practice.

### **Application for Admission**

Each applicant for admission to the School is required to fill out an application blank, whereon he states his previous education, as well as the names of persons to whom reference may be made in regard to his character and previous training.

An application fee of five dollars (\$5) is required when the application is filed. This fee is non-returnable if the applicant is accepted. If he is rejected, one-half the fee will be returned upon request.

The last page of this catalog is in the form of an application blank. It should be filled out in ink and forwarded with the required five dollar fee to Carl S. Ell, Dean, 316 Huntington Avenue, Boston, Mass.

Upon receipt of the application, properly filled out, the School at once looks up the applicant's references and high school records. When replies have been received to the various inquiries instituted, the applicant is at once advised as to his eligibility for admission to the School. All applicants must meet the Dean for a personal interview before being finally accepted by the School. This interview may be postponed if desired until the opening of School in the fall.

### **First Tuition Payment**

Should a student wish to be assigned to a position with a co-operating firm before the regular opening of School, he is required to fill out a registration card and also an application for membership in the Boston Y. M. C. A. The first payment of tuition must be paid before he will be assigned to any position at Engineering Practice.

Before any student shall be allowed to attend classes, he shall have made the first tuition payment. This is in addition to the application fee of five dollars (\$5) and the Student Activities fee of fifteen dollars (\$15), and may be paid at any time before school opens.

## REQUIREMENTS FOR ADMISSION

### **Birth and Educational Certificates**

The law in regard to the hours and conditions of labor by minors makes it necessary that all students under twenty-one years of age shall obtain Educational Certificates before they can be accepted by co-operating firms. For those students who live outside of Boston, it will save time and trouble if they bring a Certificate of Birth, or an Educational Certificate, with them on coming to Boston. The Educational Certificates are obtained free, upon request, from the Superintendent of Schools in the city or town where the student lives, if he lives in Massachusetts. For students living in other states a Certificate of Birth, or its equivalent, is all that will be necessary.

### **Subjects for Examination**

Applicants who have not passed algebra to quadratics and plane geometry satisfactorily in their courses of study in high school are required to pass entrance examinations in these subjects.

By writing the School, prospective applicants may receive copies of former entrance examinations. These copies are available for distribution and may be obtained at any time.

The detailed requirements in these subjects are as follows:

#### **Algebra**

The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; linear equations, both numerical and literal, containing one, or more, unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative.

#### **Plane Geometry**

The usual theorems and construction of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas, regular polygons and the measurement of the circle.

## *SCHOOL OF ENGINEERING*

The solution of numerous original exercises, including loci problems. Applications to the mensuration of lines and plane surfaces.

### **Entrance Examinations in Boston**

Examinations for admission to the first year class will be held at 316 Huntington Avenue in January, June and September of each year.

Students are advised to attend the January or June examinations, if possible, in order that any deficiencies then existing may be made up in September.

The time of examinations is as follows:

10:00 a. m. to 12:00 m., Algebra;

1:00 p. m. to 3:00 p. m., Plane Geometry.

During the current year the examinations will be given on the following days: January 19, 1922; June 15, 1922; Sept. 7, 1922.

No fees are to be paid at the time of the examination.

### **Preparatory Schools**

There are day and evening preparatory schools conducted by Northeastern. Students having entrance conditions, or requiring further preparation for the entrance examinations, may avail themselves of this opportunity to cover the desired work.

### **Provisional Acceptance**

When, for any reason it is deemed advisable, the School reserves the right to place any entering student upon a period of probation, extending from one to three months, before placing him at practical work. Whether he shall be placed at work at the end of this time or not will be determined by the character of the work that he has accomplished during this probationary period.

## SCHOOL INFORMATION IN DETAIL

### Location

The School is housed in the buildings of the Association, and in addition occupies the entire third floor of the Gainsborough Building, directly opposite.

The buildings are located on Huntington Avenue, just beyond Massachusetts Avenue, and are within easy access to the various railroad stations, and the business and residential sections. A map is shown on the following page.

### Residence

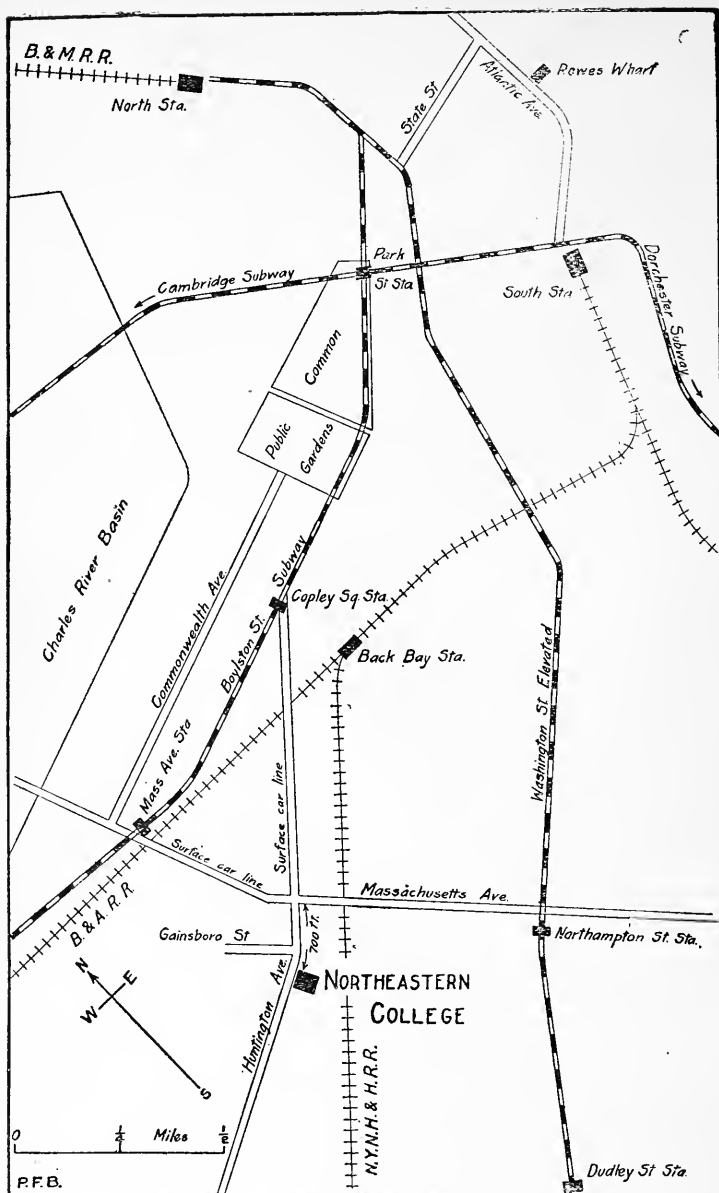
It has been found to be much more satisfactory for the student to live within easy access of Boston, especially during periods in school, than to live out twenty-five or thirty miles. The saving of time and effort more than offset any increased expense.

There are limited accommodations at very moderate rates in the dormitories. These rooms may be had separately or in groups with a common reception room. The price varies from \$2.25 per week upwards. Since board costs about \$8.00 per week, a student may obtain room and board for from \$10.25 per week upwards.

Residence in Boston, though not required, is advisable as it gives the student opportunity to use the college facilities outside of class hours, and to confer easily with his instructors about his college work. It also gives him a wider range in the choice of a co-operating position, since he can readily report for early work if necessary, which is often impossible if the student lives at a distance from Boston. Moreover, residence in Boston gives the student close connection with the activities of college life.

The School officials have no jurisdiction in the matter of dormitory assignments. Students should write the House Secretary of the Boston Y. M. C. A. for rooms in the dormitories.

The Department of Student Activities maintains a registry of suitable rooms in the nearby houses for the convenience of students desiring accommodations outside of the dormitories.



## DETAILED INFORMATION

### School Year

The school year for all students is of forty-nine weeks' duration, divided into twenty-three weeks of school work and twenty-six weeks of engineering practice. Thus each student has three weeks of vacation each year. The school work is divided into three terms—the First Semester of ten weeks, the Second Semester of ten weeks, and the Summer Term of three weeks.

The First Semester for Division A begins each year on the second Monday in September, and this constitutes the beginning of the school year for all students. The second Summer Term follows the vacation period and closes the official school year.

### Attendance

Students are expected to attend all exercises in the subjects they are studying, unless excused by the Registrar. Exercises are held, and students are in general expected to devote themselves to the work of the School, between 9:00 a.m. and 5:00 p.m., with a one-hour lunch period, on every week day except Saturday. Saturday classes are held only between 9:00 a. m. and 1:00 p.m.

### Four-Year Curriculums

The School offers four-year college curriculums of study, in co-operation with engineering firms, in the following branches of engineering, leading to the Bachelor's degree:

1. Civil Engineering.
2. Mechanical Engineering.
3. Electrical Engineering.
4. Chemical Engineering.
5. Administrative Engineering.

Descriptions of the curriculums and schedules showing the subjects of instruction included will be found on succeeding pages.

### Tuition Fees

The tuition fee in each curriculum is one hundred and seventy-five dollars (\$175) a year for each of the four years.

## SCHOOL OF ENGINEERING

The tuition for freshmen is payable as follows:

### *Division A*

<i>School Periods</i>	<i>Tuition Due</i>
Sept. 11, 1922, to Jan. 27, 1923	\$60 Sept. 11, 1922
and	\$50 Nov. 20, 1922
Aug. 20, 1923, to Sept. 8, 1923	\$50 Jan. 22, 1923
	\$15 Aug. 20, 1923

### *Division B*

<i>School Periods</i>	<i>Tuition Due</i>
Jan. 29, 1923, to June 15, 1923	\$60 Jan. 29, 1923
and	\$50 April 9, 1923
June 18, 1923, to July 7, 1923	\$50 June 11, 1923
	\$15 July 2, 1923

The tuition for upperclassmen is payable as follows: sixty dollars (\$60) at the beginning of the first school period; fifty dollars (\$50) at the beginning of the second school period; fifty dollars (\$50) at the beginning of the third school period, and fifteen dollars (\$15) at the beginning of the summer term.

All students who were in attendance at the School June 1, 1920, will be permitted to complete their courses of study at the same rate of tuition as was charged when they first registered in the school. The tuition fee for all such students in the four-year curriculums is payable as follows: sixty dollars (\$60) at the beginning of the first school period; thirty-five dollars (\$35) at the beginning of the second school period; thirty dollars (\$30) at the beginning of the third school period.

### **Full-Time Students**

Students attending school in both division A and B during the first and second semesters are charged a minimum additional tuition fee of twenty-five dollars (\$25) a semester in addition to the regular yearly rate. Such students who are registered for more than sixteen hours of school work a semester, over and above the amount of work prescribed in the catalog for the year in which they are enrolled, are charged one dollar and fifty cents (\$1.50) an hour per semester for each hour above sixteen. In computing additional hours, the catalog schedules are used and both hours of exercises and hours of preparation are counted. Students not on a

## DETAILED INFORMATION

full-time basis, but taking extra work, will be charged at the rate of one dollar and fifty cents (\$1.50) an hour per semester for all work in excess of the regular schedule.

Students who attend both summer terms in any one summer are charged an additional tuition fee of twenty-five dollars (\$25) for the second summer term. The tuition for special students in the summer terms is twenty-five dollars (\$25) a term.

Failure to make the required payments on time renders the student liable to be barred from his classes or suspended from Engineering Practice until the matter has been adjusted with the Bursar.

The yearly tuition fee includes the \$5.00 membership in the Boston Y. M. C. A. This fee is not included in the tuition for special summer term students.

### Laboratory Fees and Deposits

#### CHEMICAL LABORATORY

All students taking chemical laboratory work are required to make a deposit of five dollars (\$5) at the beginning of each year, from which deductions are made for breakage and destruction of apparatus in the laboratory. Any unused portion of this deposit is returned to the student at the end of the school year. In case the charge for such breakage or destruction of apparatus is more than five dollars (\$5), the student is charged the additional amount.

Students enrolled in the curriculums in Chemical Engineering will be charged a laboratory fee in accordance with the following rates:

<i>Course</i>	<i>Fee</i>
41-2 Inorganic Chemical Laboratory .....	\$5.00
42-2 Qualitative Analysis Laboratory .....	10.00
43-2 and 44-2 Quantitative and Technical Analysis combined ..	5.00
45-2 Organic Chemical Laboratory .....	10.00
45-4 Organic Chemical Laboratory .....	5.00
47-2 Industrial Chemical Laboratory .....	5.00

#### ELECTRICAL LABORATORY

Students taking electrical laboratory work will be charged a laboratory fee in accordance with the following rates:

## SCHOOL OF ENGINEERING

	<i>Course</i>	<i>Fee</i>
30-4	Applied Electricity Laboratory .....	\$5.00
32-4	Electrical Engineering II Laboratory .....	5.00
32-6	Electrical Engineering III Laboratory .....	5.00
32-8	Electrical Engineering IV Laboratory .....	10.00
32-2	Electrical Measurements Laboratory .....	5.00

### PHYSICS LABORATORY

Students taking courses in the physics laboratory will be charged a laboratory fee of \$2.00 per year.

### ENGINEERING LABORATORY

Students taking courses in engineering laboratory will be required to pay a laboratory fee of \$2.00 per year.

### TESTING MATERIALS LABORATORY

Students enrolled in the course in testing materials laboratory are charged a laboratory fee of \$2.00 per year.

### Student Activities Fee

Each student in the School is charged a Student Activities Fee of fifteen dollars (\$15). Ten dollars of this fee is payable at the time of registration and is non-returnable, five dollars is payable with the third payment of tuition. This fee supports certain student activities, and includes membership in the *Northeastern Engineering Athletic Association*, subscription to the *Northeastern Tech*, the school paper, and subscription to the *Cauldron*, the college year book. The services of a physician are also available under this fee. Only minor ailments, however, are treated. Should the student show signs of more serious illness, he is immediately advised to consult a specialist or return to his home, where he can get more adequate treatment.

### Payments

All payments should be made to Galen D. Light, Bursar.

All checks should be made payable to The Bursar, Northeastern College.

### Refunds

As the College assumes the obligation of carrying the student throughout the year when the student registers, and as

## DETAILED INFORMATION

the College provides the instruction and accommodations on a yearly basis, the Committee on Refunds has ruled as follows:

- A. Applications for refunds must be presented within sixty days after withdrawal from school.
- B. Credits or refunds may be granted only as stated below:
  1. If the reasons as set forth in the application meet with the approval of the Committee on Refunds, the unused portion of the tuition paid by the applicant may be placed in suspense and used at some future time by the applicant to apply upon tuition in any school in Northeastern College, provided it is used within two years.
  2. Cash refunds may be granted only in cases where students are compelled to withdraw on account of personal illness. The application must be accompanied by a satisfactory certificate from a physician.

### **Books and Supplies**

All supplies may be purchased at the College Book Store at a cost of twenty dollars (\$20) to twenty-five dollars (\$25) a year. The supplies for the freshman year cost somewhat more than this because a set of drawing instruments must be obtained. The earnings of the students for their services with the co-operating firms considerably exceed the cost of tuition, fees, the cost of books and supplies, and incidental expenses. The purchase of supplies is therefore not a burden to the student.

### **Elective Subjects**

Students electing any course not included in their curriculum will be required to take all examinations in that course and to attain a passing grade in it before they will be eligible for a degree.

### **Status of Students**

The ability of students to continue their courses is determined by means of daily work and examinations, but regularity of attendance and faithfulness to daily duties are considered equally essential.

When a student elects a curriculum, he is required to

## *SCHOOL OF ENGINEERING*

complete all courses included therein in order to be graduated. No subject is to be dropped, or omitted, without the consent of the Committee on Scholarship and the approval of the Dean.

Any student failing to make a satisfactory record, either in school or practical work, may be removed from his position in practical work, or from the School.

Students transferring from approved colleges will be admitted to advanced standing provided that their record warrants such a procedure. Whenever a student enters with advanced standing and it is found that he shows inadequate preparation in any of his pre-requisite subjects, the faculty reserves the right to require the student to repeat in class the subjects in question.

A special student is permitted to attend the School, subject to the approval of the faculty, and to take such courses as the School offers. Special students are not eligible for a degree.

### **Examinations**

Examinations covering the work of the term are usually held at the close of each term. Exceptions may be made in certain courses where, in the opinion of the instructor, examinations are not necessary.

Condition examinations for all courses are given during the week immediately following the last week of the Summer Term for Division A, and during the week preceding the Summer Term for Division B. Condition examinations are not given for courses in which no final examination was given. Special examinations can be arranged for only by vote of the Committee on Scholarship, and for all such examinations the college requires the payment of a special fee of five dollars (\$5).

### **Probation**

Students are placed on probation either by the Executive Committee or the Committee on Scholarship. Failure to show proper respect for constituted authority; infringement of the rules and regulations of the college; disregard of obligations to a co-operative firm, etc., constitute insubordination. All matters of insubordination are handled by

## DETAILED INFORMATION

the Executive Committee and the penalty for such may be probation.

Failure to meet the standards set by the Committee on Scholarship, unless the failure is supported by causes wholly beyond the student's control, will necessitate the committee placing the student on probation.

Removal from probation is in the hands of the committee placing the student thereon.

### **Rules of Standing in Scholarship**

A student's grade is officially recorded by letters and percentages, as follows:

A, excellent, 90-100 per cent.

B, good, 80-89 per cent.

C, fair, 70-79 per cent.

D, passable, 60-69 per cent.

E, work incomplete or unsatisfactory, 40-59 per cent.

F, complete failure, below 40 per cent.

A mark of E in any particular subject entitles the student to make up the unsatisfactory work, or to take a condition examination. This letter is given for all grades below 60 per cent on intermediate reports.

A mark of F denies the privilege of taking a condition examination, and the course must be repeated.

A student who does not remove a condition before that course is repeated a year later must take the course over again. A condition in more than one subject involves the loss of the privilege of being a candidate for graduation with the student's class, and may involve the loss of assignment to Engineering Practice.

The responsibility for the removal of a condition rests with the student, who is required to ascertain when and how the condition can be removed.

No student may qualify as a candidate for a degree in any given year unless clear in all the required subjects of the lower years of his chosen curriculum. He must also be in good standing in all courses for which he is enrolled.

Entrance requirements or preparatory subjects pursued in the School are considered as required school work.

## *SCHOOL OF ENGINEERING*

### **Absences**

No "cuts" are allowed, and a careful record of attendance upon exercises is kept for each student. Absence from exercises regularly scheduled in any subject will seriously affect the standing of a student, and may cause the removal of the subjects from which he is absent from his schedule and the listing of these subjects as conditioned subjects. In case he presents a reasonable excuse for the absence, however, he may be allowed to make up the time lost and be given credit for the work; but he must complete the work at such time and in such manner as his instructor in the course, with the approval of the head of his department, shall designate. Laboratory work lost can be made up only when it is possible to arrange for the necessary time during hours when these departments are open for regularly scheduled instruction. Absences from exercises immediately preceding or following a recess are especially serious and entail severe penalizing.

Attendance at all mass meetings of the student body is compulsory. Exceptions to this rule are made only when the student has received permission from the Registrar, previous to the meeting from which he desires to be absent.

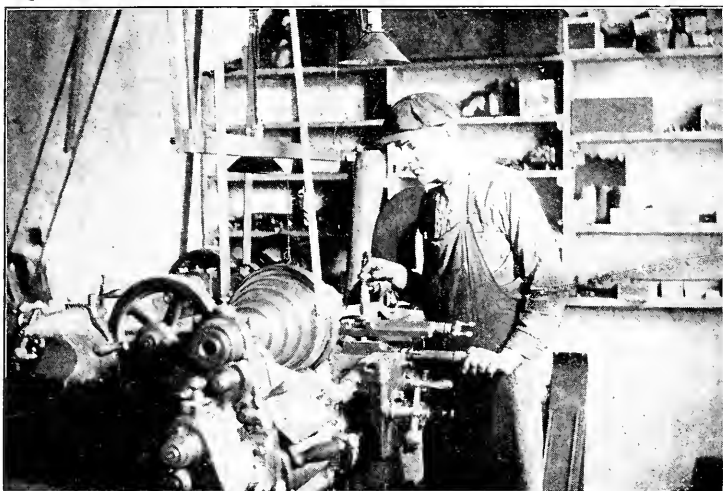
### **Reports of Standing**

Reports of standing of all students are issued four times a year, which will be at the end of each five-week school period. In addition to these regular periods, a special report on the subjects taken during the summer term will be issued immediately at the close of the summer term. All questions relative to marks are to be discussed with the student's faculty advisor, who, in turn, will make all necessary recommendations to the Committee on Scholarship, through the head of his department.

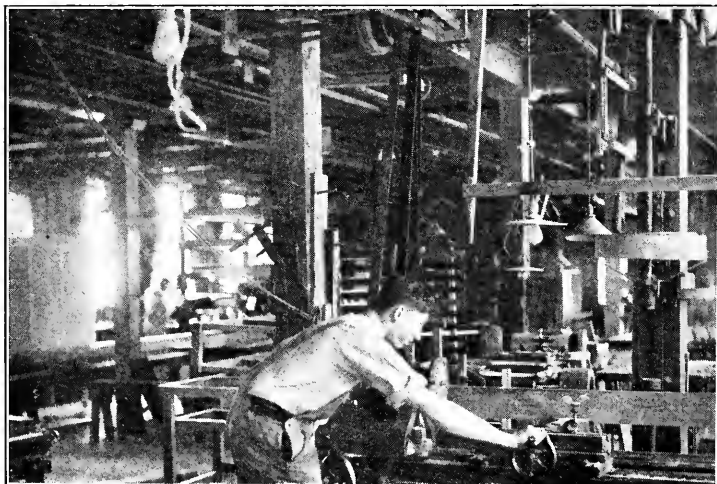
Every effort is made to keep the student up in his studies. Parents and students are always welcomed by the Dean and advisors for conference upon such matters. Special reports on a student's work will be sent to parents at any time, upon request.

Parents or guardians will be notified in all cases when students are advised, or required, to withdraw from the School.

## Mechanical Engineering Students



Operating a Lathe  
H. G. BUTT MFG. COMPANY

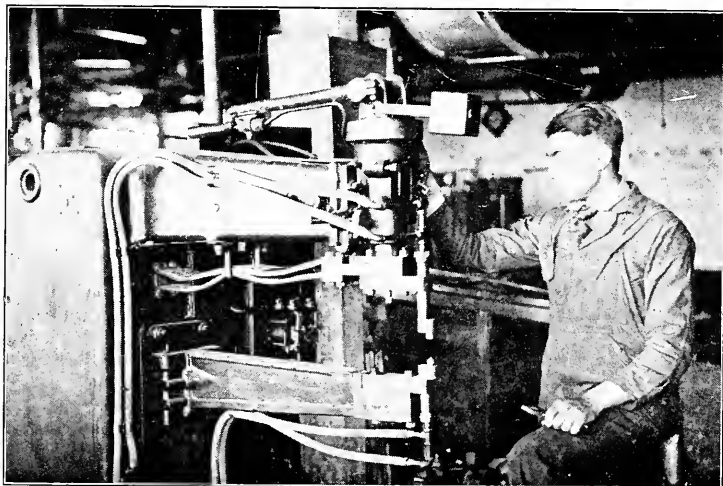


Wood Turning  
DENNISON MFG. CO., FRAMINGHAM

## Electrical Engineering Students



Making Tensile Tests on Steel  
GENERAL ELECTRIC COMPANY, LYNN



Operating a Spot Welder  
UNITED SHOE MACHINERY COMPANY, BEVERLY

## Conduct

It is assumed that students come to the School for a serious purpose, and that they will cheerfully conform to such regulations as may from time to time be made. In case of injury to any building, or to any of the furniture, apparatus, or other property of the School, the damage will be charged to the student, or students, known to be immediately concerned; but if the persons who caused the damage are unknown, the cost for repairs may be assessed equally upon all the students of the School.

Students are expected to behave with decorum, to obey the regulations of the School, and to pay due respect to its officers. Conduct inconsistent with the general good order of the School, or persistent neglect of work, if repeated after admonition, may be followed by dismissal, or, in case the offense be a less serious one, the student may be placed upon probation. The student so placed upon probation may be dismissed if guilty of any further offense.

It is desired to administer the discipline of the School so as to maintain a high standard of integrity and a scrupulous regard for truth. The attempt of any student to present, as his own, any work which he has not performed, or to pass any examination by improper means, is regarded as a most serious offense, and renders the offender liable to immediate expulsion. The aiding and abetting of a student in any dishonesty is also held to be a grave breach of discipline.

## Advisors

Upon entering the School each student is assigned to a faculty member as his Advisor, who takes an active interest in the student's welfare from all points, and not only guides and assists him in the satisfactory pursuit of his studies, but keeps a close watch on all matters which might tend to hamper the student in his College life, and sees that such hampering does not occur so far as possible.

In the upper years the function of the Advisor is somewhat different and tends more toward consultation and suggestions bearing on the student's plans and probable work after graduation.

## STUDENT ACTIVITIES

A moderate participation in social and athletic activities is encouraged by the Faculty, although a standard of scholarship which is incompatible with excessive devotion to such pursuits is required of the students.

### Student Activities Committee

The student body has organized a number of groups, or clubs, all of which come under the jurisdiction of the Student Activities Committee. This committee consists of students elected from the various classes, and has general supervision over all social functions of the School. The committee has opened a Student Activities Room, a club room for all members of the School, in which current periodicals, magazines, and engineering books of interest to the young engineer are available for the student's use during his leisure moments. The committee has also formed the Musical Clubs, which consist of an orchestra, a band, a banjo and mandolin club, and a glee club. In order to provide for the social intercourse of the students, as well as to enable the men in the different divisions to meet one another, socials and entertainments are held for their exclusive enjoyment.

### The Northeastern Engineering Athletic Association

The Athletic Association consists of all members of the School. At the head of the association is a General Athletic Committee, consisting of the Faculty Committee on Athletics and members elected from the student body. This committee has complete charge of all athletics. Under the guidance of efficient athletic coaches, track, basketball, swimming, and baseball teams are formed and schedules are arranged with other colleges for home games and games abroad. The association also encourages wrestling, interclass baseball and football, and tennis teams. Interclass and interdivision meets are held, as well as a field day near the close of the college year.

### The "Northeastern Tech."

The students issue a weekly paper called the *Northeastern Tech.* Here the students have an opportunity to express

## DETAILED INFORMATION

their opinions on subjects relating to study, engineering practice, social events, or topics of the day. In addition, pertinent articles by prominent men, as well as college notes and information, make this feature of student activities very valuable. Positions on the editorial staff of the paper are attained by competitive work.

### **Professional Society**

The students in the various courses are organized as a professional society known as the Northeastern College Engineering Society for the closer association of the students of the school, and for the discussion and consideration of various problems and new knowledge in the Engineering Field. Meetings are held every few weeks, at which the members are addressed by engineers and other men of prominence.

There are four sections of the society, the Civil Engineering Section, the Mechanical Engineering Section, the Electrical Engineering Section, and the Chemical Engineering Section. These sections are affiliated either by individual membership or as sections with the Boston Society of Civil Engineers, the American Chemical Society, or the American Institute of Electrical Engineers, thereby procuring for the individual that most valuable association with the successful practicing engineers of the community, and the various problems discussed by them.

### **“The Cauldron”**

“The Cauldron” is the year book of the School. The Senior Class is responsible for its publication, and the members of the staff are chosen through competitive work. The book is ready for distribution in the latter part of the second semester. It contains the usual review of the year’s work and activities, a complete history of all classes in the School, all their functions, socials, etc. It also contains a complete individual history of the entire graduating class and is a souvenir highly prized in later years by all graduates.

### **Student Activities Fund Committee**

In order to finance the foregoing student activities, this Student Activities Fund Committee has been formed, and

## SCHOOL OF ENGINEERING

consists of elected representatives from the Student Activities Committee, the Northeastern Engineering A. A., and the *Northeastern Tech.* This committee apportions the Student Activities Fee among the various activities. Thus the Musical Clubs, the Student Activities Room, the athletic teams, and the college paper are supported by proper apportionment of the fifteen-dollar fee paid by each student at the beginning of the college year.

### Student Council

This is the student governing body, and comprises the leaders of the various classes, organizations, clubs, and teams. It acts as a supreme student governing body. It has jurisdiction, under proper supervision of the Faculty, over all student matters, as customs, privileges, or such other matters which can properly be decided upon by such a body.

### The Pan-Hellenic Council

A representative from each fraternity, as well as an elected non-fraternity man from each division, make up the Pan-Hellenic Council. It has preliminary jurisdiction over laws governing the regulation of fraternities and clubs in the College.

### Annual Prizes

Prizes are awarded annually at the School of Engineering for excellence in the various departments of school activities. It is the aim of the college that such prizes should stimulate the interest of the student to attain a high proficiency in some branch of undergraduate endeavor. The prizes are as follows:

**Public Speaking.**—Cash prizes of fifty, twenty-five, and ten dollars respectively are offered yearly for excellence in the presentation of original speeches before the college at a regular student mass meeting. All students are eligible to compete for these prizes. The regulations for the contests are published in the *Northeastern Tech* early in the year.

**Engineering Conference.**—The Department of Engineering Practice annually awards a silver loving cup to the man in each of the professional sections who delivers the

## DETAILED INFORMATION

best talk before a regular Conference meeting upon an engineering topic during the year. All regular students, with the exception of freshmen, may compete for these cups.

**Thesis.**—To the senior who presents the best thesis for graduation a gold medal is awarded at the end of the college year. As each senior is required to submit a thesis before receiving a degree, the purpose of the prize is not to stimulate interest in this important part of a senior's curriculum, but to afford recognition to the man who has done unusually excellent work in meeting the thesis requirements.

**Athletics.**—A gold medal is presented annually by the School of Engineering to that senior who has made the best all-around athletic record while at the School of Engineering, provided he has been in the school for at least three years.

## REQUIREMENTS FOR GRADUATION

The School grants the degrees of:

- Bachelor of Civil Engineering.
- Bachelor of Mechanical Engineering.
- Bachelor of Electrical Engineering.
- Bachelor of Chemical Engineering.

To receive the degree of the School the student must attend the School not less than one year, which must be that immediately preceding his graduation. He must complete the prescribed studies of the four years, and must, also, pass final examinations, if required, on subjects included in his curriculum. In addition to this, he must complete satisfactorily a schedule of Engineering Practice under the supervision of the Faculty. The student must, also, prepare a thesis as defined elsewhere in this catalog. All theses and records of work done in preparation of theses, are the permanent property of the School.

The degree of the School represents not only the formal completion of the subjects in the selected course of study, but also the attainment of a satisfactory standard of general efficiency. Any student who does not show in the fourth-year work of his curriculum that he has attained such a standard,

## *SCHOOL OF ENGINEERING*

may be required, before receiving the degree, to take such additional work as shall prove his ability. A fee of ten dollars (\$10) is required of all candidates for a degree. This fee must be paid at the beginning of the second semester.

### **POSITIONS HELD BY GRADUATES**

The graduates of the School have been able to secure positions of the same grade, commanding the same salaries, as the graduates of other good technical schools. Among the positions now filled by graduates of the School are: Construction engineers, electrical engineers, power plant engineers, designing draftsmen, State and Federal employees under the Civil Service, and instructors. The success of those who have been graduated from the School is the best evidence of the value and thoroughness of the training offered.

## GENERAL INFORMATION

### PROGRAM OF STUDIES

#### General Statement

The curriculums of the various Engineering Departments are given on the following pages. The first year, it will be observed, is practically the same in all cases. A few exceptions are made in curriculums where students need some special elementary training in their professional subjects, in order that they may be of more use to their employers in their Engineering Practice.

The school year comprises twenty-three weeks of class work for each division. The twenty-three weeks are divided into two terms of ten weeks each, called the First Semester and Second Semester, and a Summer Term of three weeks. In the curriculums, each course is followed by two numbers: the first number, under the column marked "Ex," indicates the number of hours of "exercise" in recitation, laboratory, drawing room, or field work a week; the second number, under the column marked "Prep," indicates the number of hours of outside "preparation" that have been assigned as the minimum weekly requirement for each course. The work is so planned that the student will be required to spend from forty-eight to fifty-two hours a school week in preparation and class work.

The number preceding each course in the schedule of the various curriculums is an index number to the description of the content of the subject in the Synopsis of Courses.

Those courses preceded by 0 indicate general subjects. The work which is under the direction of the General Departments is designated as follows: 01, Department of English; 02, Department of Mathematics; 03, Department of Physics; and 04, Department of Drawing, etc.

The subject numbers beginning with 1 indicate subjects belonging strictly to the Department of Civil Engineering; subject numbers beginning with 2, to the Department of Mechanical Engineering; 3, to the Department of Electrical Engineering; 4, to the Department of Chemical Engineering; and 5, to the Department of Administrative Engineering.

## *SCHOOL OF ENGINEERING*

### **CIVIL ENGINEERING**

The Civil Engineering curriculum is designed to give the student a broad education in those subjects which form the basis of all branches of technical education, and a special training in those subjects comprised under the term "Civil Engineering." The student receives a sound training, both theoretical and practical, in the sciences upon which professional practice is based.

Civil Engineering covers such a broad field that no one can become expert in its whole extent. It includes topographical engineering, municipal engineering, railroad engineering, structural engineering, and hydraulic and sanitary engineering. It covers land surveying, the building of railroads, harbors, docks, and similar structures; the construction of sewers, waterworks, roads and streets; the design and construction of girders, roofs, trusses, bridges, buildings, walls, foundations, and all fixed structures. All of these branches of engineering rest, however, upon a relatively compact body of principles, and in these principles the students are trained by practice in the class room, drawing room, the field, and the testing laboratory.

The curriculum is designed to prepare the young engineer to take up the work of the design and construction of structures, to aid in the location and construction of steam and electric railways, and to undertake intelligently supervision of work in the allied fields of mining, architectural, and electrical engineering, and general contracting.

# CURRICULUM I. CIVIL ENGINEERING

## FIRST YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
010-1	English .....	3 6	010-1	English .....	3 6
020-1	College Physics .....	3 6	022-1	Analytic Geometry .....	4 6
021-1	Trigonometry .....	4 6	031-1	Physics .....	4 8
030-1	Physics .....	2 4	034-1	Physics Laboratory .....	2 2
041-1	Mechanical Drawing .....	5 0	041-2	Mechanical Drawing .....	4 0
060-1	Physical Training .....	2 0	060-1	Physical Training .....	2 0
11-1	Surveying .....	2 4	11-2	Surveying .....	2 4
11-3	Surveying, F. & P. ....	5 0	11-4	Surveying, F. & P. ....	5 0

### SUMMER TERM

012-1	History of Science .....	5	10
043-1	Descriptive Geometry ....	20	10

## SECOND YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
023-1	Differential Calculus ....	4 6	023-2	Integral Calculus .....	3 6
032-1	Light .....	3 3	033-1	Heat .....	3 4
034-2	Physics Laboratory .....	2 2	034-3	Physics Laboratory .....	2 2
050-1	Engineering Conference ..	2 0	050-1	Engineering Conference ..	2 0
11-5	Surveying .....	2 4	12-1	Railroad Surveying .....	3 4½
11-6	Surveying, F. & P. ....	5 0	12-2	Rrd. Surveying, F. & P. ...	5 0
21-1	Applied Mechanics .....	3 6	21-2	Applied Mechanics .....	3 6
30-1	Elements of Electricity ..	3 3	30-3	Applied Electricity .....	3 3

### SUMMER TERM

30-4	Applied Electricity Laboratory	15	30
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## THIRD YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
013-1	Government .....	2 4	014-1	Economics .....	2 4
050-1	Engineering Conference ..	2 0	050-1	Engineering Conference ..	2 0
11-8	Topographical Drawing ..	3 0	14-1	Theory of Structures .....	3 6
12-3	Railroad Engineering ....	2 4	14-2	Structural Drawing .....	3 0
12-4	Rrd. Engineering, F. & P. ...	5 0	16-2	Testing Materials Lab. ...	2 2
13-1	Hydraulics .....	3 6	21-3	Strength of Materials .....	3 6
16-4	Geology .....	2 4	23-3	Heat Engineering .....	3 6
21-3	Strength of Materials ....	3 6	40-1	Inorganic Chemistry .....	4 4

### SUMMER TERM

042-5	Engineering Drawing .....	25	20
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## FOURTH YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
050-1	Engineering Conference ..	2 0	050-1	Engineering Conference ..	2 0
052-1	Thesis .....	1 3	052-1	Thesis .....	1 6
14-3	Engineering Structures ..	6 9	14-3	Engineering Structures ..	6 9
14-4	Structural Design .....	6 3	14-4	Structural Design .....	6 3
15-1	Concrete .....	2 4	15-1	Concrete .....	2 4
15-2	Concrete Design .....	3 0	15-2	Concrete Design .....	3 0
16-1	Materials .....	2 4	17-1	Highway Engineering ....	2 4
16-3	Foundations .....	2 2			

## *SCHOOL OF ENGINEERING*

### **MECHANICAL ENGINEERING**

The Mechanical Engineering Curriculum is designed to give the student a broad foundation in those fundamental subjects which form the basis for all professional engineering practice, and especially to equip the young engineer with a knowledge of the various phases of Mechanical Engineering. The curriculum embraces instruction by text-book, lecture, laboratory, and workshop practice, with special reference to the following branches: applied mechanics, heat engineering, industrial engineering, hydraulic engineering, applied electricity, and machine design.

The instruction aims to develop in the student the ability to think clearly and logically in the application of fundamental principles to engineering problems. The class-room work in the professional subjects is arranged with due regard to modern industrial conditions, in order that the student may connect theory with practice and appreciate the necessity of both in order to become a successful engineer. With this in view, special courses are given involving a discussion of problems which have presented themselves to the students and requiring a familiarity with the contents of current engineering periodicals. At all times it is sought to develop self-confidence in the student, and he is encouraged to take the initiative.

## CURRICULUM II. MECHANICAL ENGINEERING

### FIRST YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
010-1	English	3 6	010-1	English	3 6
020-1	College Algebra	3 6	022-1	Analytic Geometry	4 6
021-1	Trigonometry	4 6	031-1	Physics	4 8
030-1	Physics	2 4	034-1	Physics Laboratory	2 2
041-1	Mechanical Drawing	5 0	041-3	Mechanical Drawing	9 0
060-1	Physical Training	2 0	060-1	Physical Training	2 0
24-1	Production Engineering	2 3	24-2	Production Engineering	2 3
40-1	Inorganic Chemistry	4 4			

#### SUMMER TERM

012-1	History of Science	5 10
043-1	Descriptive Geometry	20 10

### SECOND YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
023-1	Differential Calculus	4 6	023-2	Integral Calculus	3 6
032-1	Light	3 3	033-1	Heat	3 4
034-2	Physics Laboratory	2 2	034-3	Physics Laboratory	2 2
042-3	Machine Drawing	6 0	044-3	Mechanism	6 6
044-2	Mechanism	2 4	050-1	Engineering Conference	2 0
050-1	Engineering Conference	2 0	21-2	Applied Mechanics	3 6
21-1	Applied Mechanics	3 6	30-3	Applied Electricity	3 3
30-1	Elements of Electricity	3 3			

#### SUMMER TERM

30-4	Applied Electricity Laboratory	15 30
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### THIRD YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
013-1	Government	2 4	014-1	Economics	2 4
050-1	Engineering Conference	2 0	050-1	Engineering Conference	2 0
13-1	Hydraulics	3 6	13-2	Hydraulic Motors	2 4
21-3	Strength of Materials	3 6	21-3	Strength of Materials	3 6
22-1	Graphical Analysis	6 3	22-2	Machine Design	6 3
23-1	Heat Engineering	3 6	22-5	Mechanism of Machines	3 3
24-3	Power Plant Equipment	2 4	23-1	Heat Engineering	3 6

#### SUMMER TERM

23-4	Steam Turbines	5 10
23-6	Engineering Laboratory	15 15

### FOURTH YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
050-1	Engineering Conference	2 0	050-1	Engineering Conference	2 0
052-1	Thesis	1 3	052-1	Thesis	1 6
15-1	Concrete	2 4	15-1	Concrete	2 4
15-2	Concrete Design	3 0	15-2	Concrete Design	3 0
16-1	Materials	2 4	22-3	Machine Design	6 3
22-3	Machine Design	6 3	24-4	Power Plant Engineering	3 6
23-5	Heat Engineering	3 6	24-6	Standard Eng. Products	
25-1	Industrial Plants	4 6		and Processes	2 4
			25-1	Industrial Plants	6 3

## *SCHOOL OF ENGINEERING*

### **ELECTRICAL ENGINEERING**

Probably none of the branches of scientific knowledge has been so markedly modified during the past decade as that relating to Electricity, nor has any other exerted such a profound influence upon the scientific thought of the period. A science, like a planet, grows in the main by a process of infinitesimal accretion. Its theory is built like a cathedral through the addition by many builders of many different elements, and this is pre-eminently true of Electricity. It is absolutely essential that the electrical engineer who hopes to make a success of his work should be able to grasp readily and absorb effectively the meaning and content of the many scientific memoirs recording the results of research bearing upon and directly influencing his chosen branch of engineering.

He must have a thorough appreciation of physical theory, a clear understanding of chemical principles, and a broad working knowledge of mathematics. It is essential that each student planning to take this curriculum should realize the fundamental necessity of obtaining a solid grounding in these three subjects upon which the success of his future work will definitely hinge, nor can he be too strongly urged to include physics in his high school preparatory course if he hopes to avoid difficulty in the earlier years.

It is not the purpose of the curriculum to attempt the impossible in aiming to turn out electrical engineers, fully trained in all the branches of the science, especially as it is becoming daily more differentiated and specialized. The curriculum is designed rather to lay a broad and secure foundation for future progress along the lines of activity which may particularly appeal to each individual student and give him a good working knowledge of the essential principles which underlie each of the more specialized branches of professional work.

Parallel with the theoretical work runs a carefully planned course of laboratory instruction which is intended to develop the student's power of accurate observation, of planning work and methods of procedure for himself with due regard to saving of time and labor and precision of the results attained.

# CURRICULUM III. ELECTRICAL ENGINEERING

## FIRST YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
010-1	English .....	3 6	010-1	English .....	3 6
020-1	College Algebra .....	3 6	022-1	Analytic Geometry .....	4 6
021-1	Trigonometry .....	4 6	031-1	Physics .....	4 8
030-1	Physics .....	2 4	034-1	Physics Laboratory .....	2 2
041-1	Mechanical Drawing .....	5 0	041-3	Mechanical Drawing .....	9 0
060-1	Physical Training .....	2 0	060-1	Physical Training .....	2 0
31-1	Elements of Elect. Eng. ....	2 3	32-1	Elect. Eng. I .....	4 4
40-1	Inorganic Chemistry ....	4 4			

### SUMMER TERM

012-1	History of Science .....	5	10
043-1	Descriptive Geometry ....	20	10

## SECOND YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
023-1	Differential Calculus ....	4 6	023-2	Integral Calculus .....	3 6
032-1	Light .....	3 3	033-1	Heat .....	3 4
034-2	Physics Laboratory .....	2 2	034-3	Physics Laboratory .....	2 2
050-1	Engineering Conference ..	2 0	050-1	Engineering Conference ..	2 0
21-1	Applied Mechanics .....	3 6	21-2	Applied Mechanics .....	3 6
32-3	Elect. Eng. II .....	3 6	32-3	Elect. Eng. II .....	4 6
32-4	Elect. Eng. II Lab. ....	6 3	32-4	Elect. Eng. II Lab. ....	6 3

### SUMMER TERM

042-5	Engineering Drawing .....	25	20
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## THIRD YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
013-1	Government .....	2 4	014-1	Economics .....	2 4
050-1	Engineering Conference ..	2 0	050-1	Engineering Conference ..	2 0
21-4	Strength of Materials ...	3 6	13-3	Hydraulics .....	2 4
23-1	Heat Engineering .....	3 6	23-1	Heat Engineering .....	3 6
32-6	Elect. Eng. III Lab. ....	6 3	32-6	Elect. Eng. III Lab. ....	6 3
32-7	Elect. Eng. III .....	3 6	32-7	Elect. Eng. III .....	3 6
33-1	Elect. Measurements ...	2 3	33-1	Elect. Measurements ...	2 3
			33-2	Elect. Measurements Lab. 3	0

### SUMMER TERM

33-2	Elect. Measurements Lab. .	25	20
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## FOURTH YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
050-1	Engineering Conference ..	2 0	050-1	Engineering Conference ..	2 0
052-1	Thesis .....	1 3	052-1	Thesis .....	1 6
13-2	Hydraulic Motors .....	2 4	24-6	Standard Eng. Products and Processes .....	2 4
23-2	Engineering Laboratory ..	2 2	32-8	Elect. Eng. IV Lab. ....	6 3
32-8	Elect. Eng. IV Lab. ....	6 3	32-9	Elect. Eng. IV .....	4 8
32-9	Elect. Eng. IV .....	4 8	34-1	Elect. Eng. V .....	4 6
34-1	Elect. Eng. V .....	4 6	35-1	Advanced Electricity ....	2 3
35-1	Advanced Electricity ....	2 3			

## *SCHOOL OF ENGINEERING*

### **CHEMICAL ENGINEERING**

The efficiency of any industrial chemical enterprise depends not only upon a knowledge of the chemical reactions forming the basis of the process, but also upon a knowledge of the mechanical principles on which depend the design, construction and maintenance of the plant for the carrying on of these reactions. Owing to the keen competition among industries which must follow the abnormal war-time production, it will be necessary to maintain the highest possible efficiency.

The purpose of this curriculum is to prepare students capable of filling the demand for trained men competent to build and operate manufacturing industries based upon chemical principles at their maximum efficiency. The professional work of the curriculum falls naturally into three groups: First, courses which provide a knowledge of the fundamental principles of chemistry. Second, those courses which furnish a knowledge of mechanical engineering. Third, engineering practice in which the student becomes familiar with the many applications of theoretical principles.

The laboratory work has been planned not only to familiarize the student with many types of chemical compounds and apparatus, but also to train the student to be an exact and logical thinker, and to encourage a desire for the application of his knowledge and training to the investigation and solution of the many problems which modern industry presents.

# CURRICULUM IV. CHEMICAL ENGINEERING

## FIRST YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
010-1	English.....	3 6	010-1	English .....	3 6
020-1	College Algebra .....	3 6	022-1	Analytic Geometry .....	4 6
021-1	Trigonometry .....	4 6	031-1	Physics .....	4 8
030-1	Physics.....	2 4	034-1	Physics Laboratory .....	2 2
041-1	Mechanical Drawing .....	5 0	041-2	Mechanical Drawing .....	4 0
060-1	Physical Training.....	2 0	060-1	Physical Training .....	2 0
41-1	Inorganic Chemistry .....	4 4	41-1	Inorganic Chemistry .....	4 4
41-2	Inorganic Chemistry Lab. 5	0	41-2	Inorganic Chemistry Lab. 5	0

### SUMMER TERM

42-1	Qualitative Analysis .....	10	20
42-2	Qualitative Analysis Lab. ...	28	0

## SECOND YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
023-1	Differential Calculus ....	4 6	011-1	German .....	2 4
032-1	Light .....	3 3	023-2	Integral Calculus .....	3 6
034-2	Physics Laboratory .....	2 2	033-1	Heat .....	3 4
050-1	Engineering Conference ..	2 0	034-3	Physics Laboratory .....	2 2
21-1	Applied Mechanics .....	3 6	050-1	Engineering Conference ..	2 0
30-1	Elements of Electricity ..	3 3	21-2	Applied Mechanics .....	3 6
43-1	Quantitative Analysis ...	2 4	30-3	Applied Electricity .....	3 3
32-2	Quantitative Anal. Lab. 5	0	43-2	Quant. Analysis Lab. ....	5 0

### SUMMER TERM

30-4	Applied Electricity Laboratory ..	15	30
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## THIRD YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
011-2	German .....	2 2	014-1	Economics.....	2 4
013-1	Government .....	2 4	050-1	Engineering Conference ..	2 0
050-1	Engineering Conference ..	2 0	13-3	Hydraulics .....	2 4
21-4	Strength of Materials ...	3 6	23-3	Heat Engineering .....	3 6
44-1	Technical Analysis .....	3 6	44-3	Technical Analysis .....	2 4
44-2	Technical Analysis Lab. 5	0	45-1	Organic Chemistry .....	3 6
45-1	Organic Chemistry .....	3 6	45-2	Organic Chemistry Lab. 5	0
45-2	Organic Chemistry Lab. 5	0	46-2	Chemical Engineering ...	2 4

### SUMMER TERM

042-5	Engineering Drawing .....	25	20
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## FOURTH YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
050-1	Engineering Conference ..	2 0	050-1	Engineering Conference ..	2 0
052-1	Thesis.....	1 6	052-1	Thesis .....	1 6
45-3	Organic Chemistry .....	2 6	45-3	Organic Chemistry .....	2 6
45-4	Organic Chemistry Lab. 5	0	45-4	Organic Chemistry Lab. 5	0
46-3	Chemical Engineering ...	3 6	46-3	Chemical Engineering ...	3 6
47-1	Industrial Chemistry .....	3 3	47-1	Industrial Chemistry .....	2 2
47-2	Industrial Chemistry Lab. 4	0	47-2	Industrial Chemistry Lab. 4	0
48-1	Physical Chemistry .....	4 8	48-1	Physical Chemistry .....	4 8

## *SCHOOL OF ENGINEERING*

### **ADMINISTRATIVE ENGINEERING**

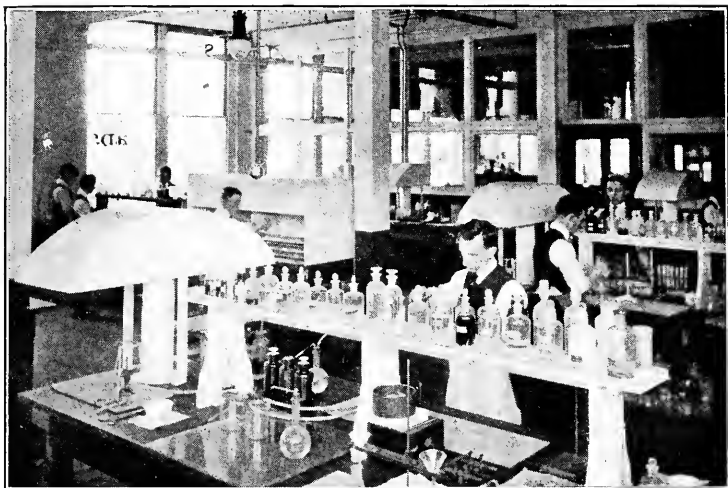
The specialized curriculums for engineering students tend toward specific training of the students in design and construction for railroad, power plant and industrial enterprises. Recently, however, need has been expressed for men capable of handling not only technical, but also administrative problems, for in many cases of technical positions there is a large measure of administrative responsibility also.

The Administrative Engineering curriculum has been planned to provide a training for men who desire a knowledge of both scientific and business principles. The curriculum combines the instruction in engineering subjects with the study of business organization and management, labor problems, business law, and accounting. The course is designed as a groundwork for efficient handling of administrative problems whenever encountered in conjunction with engineering work.

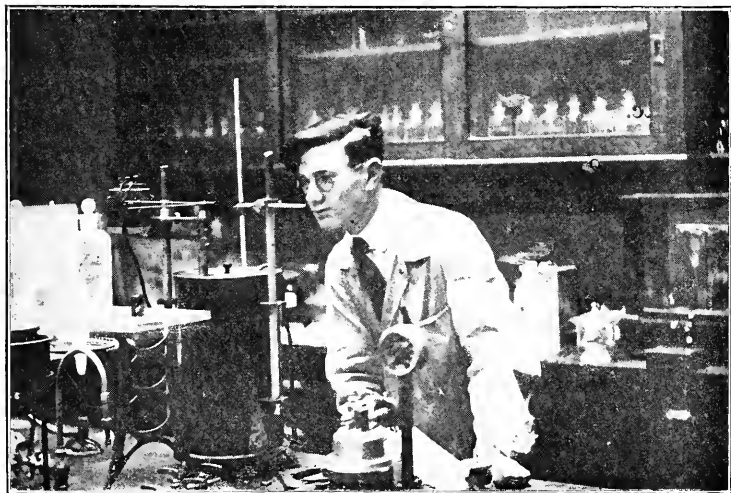
The curriculum is open to students in two options: (1) Civil Engineering and (2) Mechanical Engineering. Those who elect option (1) will have in mind positions with consulting engineers, construction companies, and public service corporations engaged in operating transportation systems, water works, and the like. Students who elect option (2) will have in mind positions with industrial plants manufacturing paper, rubber goods, shoes, cotton and woolen goods, hardware, etc.

Students completing this curriculum satisfactorily with options (1) or (2) will become candidates for the degrees of Bachelor of Civil Engineering or Bachelor of Mechanical Engineering, respectively.

# Chemical Engineering Students



Analyzing Metals  
GENERAL ELECTRIC COMPANY, LYNN

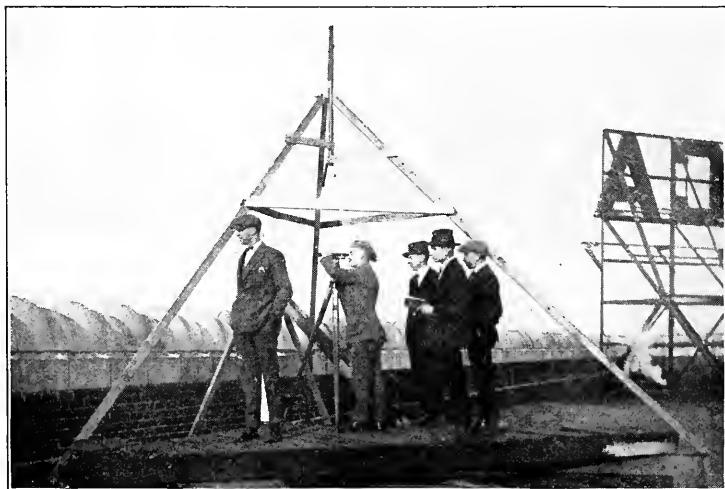


Calorimeter Testing  
INDUSTRIAL ENGINEERING CORPORATION

## Civil Engineering Students



Giving Lines and Grades for Concrete Construction  
TURNER CONSTRUCTION COMPANY



Triangulation Surveying  
NORTHEASTERN COLLEGE

# CURRICULUM V. ADMINISTRATIVE ENGINEERING

## FIRST YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
010-1	English.....	3 6	010-1	English.....	3 6
020-1	College Algebra.....	3 6	022-1	Analytic Geometry.....	4 6
021-1	Trigonometry.....	4 6	031-1	Physics.....	4 8
030-1	Physics.....	2 4	034-1	Physics Laboratory.....	2 2
041-1	Mechanical Drawing.....	5 0	041-3	Mechanical Drawing.....	9 0
060-1	Physical Training.....	2 0	060-1	Physical Training.....	2 0
11-7	Surveying.....	3 3	24-2	Production Engineering..	2 3
24-1	Production Engineering..	2 3			

### SUMMER TERM

012-1	History of Science.....	5	10
043-1	Descriptive Geometry....	20	10

## SECOND YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
023-1	Differential Calculus....	4 6	023-2	Integral Calculus.....	3 6
032-1	Light.....	3 3	033-1	Heat.....	3 4
034-2	Physics Laboratory.....	2 2	034-3	Physics Laboratory.....	2 2
042-3	Machine Drawing.....	6 0	044-3	Mechanism.....	6 6
044-2	Mechanism.....	2 4	050-1	Engineering Conference..	2 0
050-1	Engineering Conference..	2 0	21-2	Applied Mechanics.....	3 6
21-1	Applied Mechanics.....	3 6	30-3	Applied Electricity.....	3 3
30-1	Elements of Electricity..	3 3			

### SUMMER TERM

30-4	Applied Electricity Laboratory	15	30
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## THIRD YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
013-1	Government.....	2 4	014-1	Economics.....	2 4
050-1	Engineering Conference..	2 0	050-1	Engineering Conference..	2 0
21-3	Strength of Materials... 3	6	21-3	Strength of Materials... 3	6
50-1	Industrial Organization..	2 4	50-2	Industrial Finance.....	2 4
51-1	Principles of Accounting..	3 6	52-1	Banking and Securities... 3	6
OPTION 1			OPTION 1		
11-8	Topographical Drawing..	3 0	14-1	Theory of Structures....	3 6
13-1	Hydraulics.....	3 6	14-2	Structural Drawing.....	3 0
16-4	Geology.....	2 4	16-2	Testing Materials Lab..	2 2
OPTION 2			OPTION 2		
22-1	Graphical Analysis.....	6 3	22-2	Machine Design.....	6 3
23-1	Heat Engineering.....	3 6	23-1	Heat Engineering.....	3 6

### SUMMER TERM

50-3	Corporations.....	5	10
51-2	Cost Accounting.....	10	20

## FOURTH YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
050-1	Engineering Conference..	2 0	050-1	Engineering Conference..	2 0
052-1	Thesis.....	1 3	052-1	Thesis.....	1 6
50-4	Business Management... 3	6	50-6	Business Administration..	3 6
50-5	Marketing.....	3 6	53-1	Business Law.....	2 4
OPTION 1			OPTION 1		
14-3	Engineering Structures..	6 9	14-3	Engineering Structures..	6 9
14-4	Structural Design.....	6 3	14-4	Structural Drawing.....	6 3
OPTION 2			OPTION 2		
16-1	Materials.....	2 4	13-3	Hydraulics.....	2 4
22-3	Machine Design.....	6 3	24-4	Power Plant Engineering..	3 6
25-1	Industrial Plants.....	4 6	25-1	Industrial Plants.....	6 3

## *SCHOOL OF ENGINEERING*

### **SUBJECTS OF INSTRUCTION**

Instruction is given by lectures and recitations, and by practical exercises in the field, in the laboratories, and in the drawing rooms. A great value is set upon the educational effect of these exercises, and they form the foundation of each of the five curriculums. In many branches the instruction given differs widely from available texts in which cases notes on the lectures and laboratory work are usually issued to the students. Besides oral examinations in connection with the ordinary exercises, written examinations are held from time to time.

In the following pages will be found a more or less detailed statement of the scope of the subjects offered in the various curriculums. The subjects are classified, as far as possible, related studies being arranged in sequence. The subjects are numbered for convenience in consulting the various curriculums. A complete table of the Subjects of Instruction will be found at the end of the catalog. Under each subject is given a list of the courses required as preparation for that subject. These requirements are made as it is felt that the student must have become proficient in all these subjects for a clear comprehension of the advanced work. In some cases, the required preparation may be taken simultaneously and must be completed before further advanced work is undertaken.

Students electing any subject must complete that subject in order to be a candidate for a degree.

By careful consideration of the curriculums, in connection with the following Program of Studies, the applicant for a special curriculum may select, for the earlier part of that curriculums, such subjects as will enable him to pursue later those more advanced subjects which he may particularly desire. Applications for exception from the required preparation as stated in connection with each subject described below, will be passed on by the Faculty.

The topics included in the list which follows are subject to change at any time by action of the School authorities.

## PROGRAM OF STUDIES

In the following synopses under each subject, "curriculums" refers to the five principal curriculums of Civil I, Mechanical II, Electrical III, Chemical IV, and Administrative V. In the case of curriculum V,  $V_1$  refers to the Civil Engineering option and  $V_2$  to the Mechanical option, and V to both options in which that particular subject is required. The courses themselves are arranged in groups according to the departments under which the course falls.

The "year" refers to the time when the subject is ordinarily taken under the regular schedule, "both semesters" referring to both the First and Second Semesters, and "Summer Term" referring to the three-week term starting in June or in August. "Preparation" gives the courses by number that the student must have taken and passed satisfactorily before he may be permitted to take the course under discussion, except in a few stated cases where the preparation may be taken simultaneously. Under the number of "hours per week," "Ex." refers to the hours of class room or laboratory work, and "Prep." to the hours of outside preparation. The main body of the synopsis shows in a brief form the ground covered by the course. At the end of the synopsis is given the names of the instructors for that particular subject; the first named being in charge.

# SCHOOL OF ENGINEERING

## GENERAL DEPARTMENTS

### Liberal Subjects

#### 010-1 ENGLISH

*All curriculums*  
*First year, both semesters*

*Preparation: — —*  
*Three hours per week*

English Composition especially adapted to the needs of men who expect to follow the engineering profession. Watt's "The Composition of Technical Papers" forms the basis of the course. The work consists of lectures, recitations, class discussions, weekly themes, tests, reports, and a limited amount of outside reading, particularly in modern scientific journals. The material for the themes is entirely drawn from, or related to, the student's study in the laboratory and experience in his Engineering Practice with the co-operating firm.

PROFESSOR MELVIN.  
MR. JEFFERY.

#### 011-1 GERMAN

*Curriculum: IV*  
*Second year, second semester*

*Preparation: — —*  
*Two hours per week*

All students in the Chemical Engineering Curriculum are required to show before graduation a sufficient knowledge of the German language to be able to read technical books and scientific articles written in the German language. For students who have not obtained this knowledge before entering college, this course will offer a study of grammatical forms, syntax, and vocabulary through composition exercises and rapid reading. The entire purpose is to give the student a knowledge of German grammar with a working vocabulary of scientific terms.

MR. PERKINS.

#### 011-2 GERMAN

*Curriculum: IV*  
*Third year, first semester*

*Preparation: 011-1*  
*Two hours per week*

A continuation of German 011-1.

MR. PERKINS.

## PROGRAM OF STUDIES

### 012-1 HISTORY OF SCIENCE

*Curriculums: I, II, III, V*

*Preparation: — —*

*First year, summer term*

*Five hours per week*

The aim is to give a broad view of the growth of science, extend the range of the student's interests, and encourage discriminating scientific reading. Considerable collateral reading is required of the students.

PROFESSOR DURKEE.

### 013-1 GOVERNMENT

*All curriculums*

*Preparation: — —*

*Third year, first semester*

*Two hours per week*

The theory and practice of government in the existing forms of national organization in the United States and Great Britain. The relations between the executive, the legislature, and the judiciary will form the basis of investigation. In the lectures additional illustrative material will be taken from France, Switzerland, and Canada. It is hoped that the men will look on the study of government, not as academic but as practical, through constant reference to contemporary men and affairs.

PROFESSOR MELVIN.

### 014-1 ECONOMICS

*All curriculums*

*Preparation: — —*

*Third year, second semester*

*Two hours per week*

A rapid survey of the elementary principles of economics, such as those of wealth, labor, capital, value, price, and so forth. Particular attention is paid to the consideration of money, the mechanism of exchange, banking and its relation to the finances of corporations. In studying the distribution of wealth, considerable attention is paid to the questions of wages and value, and their relation to business profits.

PROFESSOR SPEAR.

## Mathematics

### 020-1 COLLEGE ALGEBRA

*All curriculums*

*Preparation: — —*

*First year, first semester*

*Three hours per week*

Beginning with quadratic equations, the student has an opportunity to review the various operations of simpler

## SCHOOL OF ENGINEERING

algebra. A study of the theory of exponents, series, determinants, principles of theory of equations, graphs, permutations and combinations, and principles of vector analysis is also included.

PROFESSORS SPEAR AND COOLIDGE.  
MESSRS. GOODRIDGE AND JEFFERY.

### 021-1 TRIGONOMETRY

*All curriculums*

*Preparation: 020-1  
taken concurrently*

*First year, first semester*

*Four hours per week*

Trigonometric functions as ratios; transformation and solution of trigonometric equations; inverse functions; circular functions; goniometry; logarithms; solution of exponential equations; solution of right and oblique triangles; law of sines, cosines, and tangents; areas. Considerable practice in calculations of practical problems enable the student to apply his trigonometry to problems arising in Engineering Practice at an early stage. Explanation of laws of spherical trigonometry.

PROFESSORS BENEDICT AND COOLIDGE.  
MESSRS. GOODRIDGE, PORTER AND STEARNS.

### 022-1 ANALYTIC GEOMETRY

*All curriculums*

*Preparation: 021-1*

*First year, second semester*

*Four hours per week*

Cartesian and polar co-ordinates. The equations of straight lines and simpler curves derived from the geometric properties of the curves. Properties of curves derived from their equations. Thorough study of straight line, circle, and conic sections. Intersection of curves, transformation of axes. Plotting of polynomials, including exponential, trigonometric, and logarithmic functions. Loci problems. An endeavor is made to develop the analytic sense in the student throughout the course, rather than to rely on the use of formulae.

PROFESSOR SPEAR.  
MR. GRAMSTORFF.

### 023-1 DIFFERENTIAL CALCULUS

*All curriculums*

*Preparation: 022-1*

*Second year, first semester*

*Four hours per week*

Theory of limits; rates of change; differentiation of algebraic, trigonometric, exponential, and logarithmic func-

## PROGRAM OF STUDIES

tions; slopes of curves; maxima and minima, with practical problems; partial differentiation; derivatives of higher order; lengths of curves; radius of curvature, etc.; expansion of functions, series.

Although the subject matter deals with considerable theory, constant sight is kept of the practical application of all the theory. The geometric interpretation of every new subject is carefully defined, and problems are continually solved dealing in practical applications of theory. Velocity and acceleration problems in mechanics are typical of those used for application of differentiation.

PROFESSOR SPEAR.

### 023-2 INTEGRAL CALCULUS

*All curriculums*

*Second year, second semester*

*Preparation: 023-1*

*Three hours per week*

A continuation of Calculus, 023-1. Integration as the inverse of differentiation; intergration as a summation; definite integrals; use of tables; double and triple integrals; areas in rectangular and polar co-ordinates; volumes; center of gravity; moment of inertia. Practical problems depending on the differential and integral calculus for solution. Solution of simpler differential equations.

PROFESSOR SPEAR.

## Physics

### 030-1 PHYSICS

*All curriculums*

*First year, first semester*

*Preparation: — —*

*Two hours per week*

A course in the fundamental principles of elementary Physics to be taken by students who have not had sufficient preparation for the subsequent courses in Physics. The course includes the principles of mechanics, heat, light, and sound, with problems, lectures, and experiments.

PROFESSOR COOLIDGE.

### 031-1 PHYSICS

*All curriculums*

*First year, second semester*

*Preparation: 021-1, 030-1*

*Four hours per week*

A study of the principles of mechanics, statics, and dynamics. The subjects studied are: equilibrium of bodies acted

## SCHOOL OF ENGINEERING

upon by parallel forces, equilibrium of bodies acted upon by concurrent forces, vectors, relative velocities, uniform velocity, uniformly accelerated motion, simple harmonic motion, motion on an inclined plane, energy, work, horsepower, angular velocity and acceleration, moment of inertia, kinetic energy of rotation, centrifugal force, fluid pressure, density and specific gravity of solids and liquids, Boyles law, and hydrometers. It is the purpose of the course to lay a thorough foundation for subsequent study of experimental and technical physics. Hence it is planned with immediate reference to familiarize the pupil with the fundamental principles of the science.

PROFESSOR COOLIDGE.  
MESSRS. STEARNS, GOODRIDGE AND GRAMSTORFF.

### 032-1 LIGHT

*All curriculums*

*Second year, first semester*

*Preparation: 021-1, 030-1*

*Three hours per week*

The study of Light, including wave motion, mirrors, refraction, lenses, optical instruments, dispersion, interference, diffraction, and polarization of light.

PROFESSOR COOLIDGE.

### 033-1 HEAT

*All curriculums*

*Second year, second semester*

*Preparation: 030-1*

*Three hours per week*

The topics studied are: thermometry, expansion of solids, liquids, and gases, calorimetry, change of state including latent heat of fusion and vaporization (sublimation), triple point diagram, conduction and radiation, and the mechanical equivalent of heat.

PROFESSOR COOLIDGE.

### 034-1 PHYSICS LABORATORY

*All curriculums*

*First year, second semester*

*Preparation: 031-1  
taken concurrently*

*Two hours per week*

A series of experiments of an elementary grade for students who are found to be deficient in the simpler fundamentals of Physics.

PROFESSOR COOLIDGE.  
MR. STEARNS AND ASSISTANTS.

## PROGRAM OF STUDIES

### 034-2 PHYSICS LABORATORY

*All curriculums*

*Second year, first semester*

*Preparation: 034-1*

*Two hours per week*

Experiments on mechanics performed by each student, supplementing the lecture and class room work in Physics 031-1. The experiments include the use of verniers, micrometers, and spherometers, calculation of true weights, determination of specific gravities of solids by various methods, areas by planimeter, modulus of elasticity, and motion on an inclined plane.

PROFESSOR COOLIDGE.

MR. STEARNS AND ASSISTANTS.

### 034-3 PHYSICS LABORATORY

*All curriculums*

*Second year, second semester*

*Preparation: 032-1, 033-1  
taken concurrently*

*Two hours per week*

A series of experiments on Light and Heat to supplement the work done in Physics 032-1 and Physics 033-1. The experiments on Light include the determination of the index of refraction of a lens, the position of images in combinations of lenses, and the uses of the spectrometer and spectroscope. The experiments on Heat include the calibration of a thermometer, determination of the temperature of a mixture, the relations between the pressure and boiling point of water, and the use of the air thermometer.

PROFESSOR COOLIDGE.

MR. STEARNS AND ASSISTANTS.

## Drawing

### 041-1 MECHANICAL DRAWING

*All curriculums*

*First year, first semester*

*Preparation: —*

*Five hours per week*

An elementary course embracing straight line and compass exercises, geometrical constructions, lettering, orthographic projection and development.

PROFESSORS ASHLEY AND GEE.

MR. GRAMSTORFF.

## SCHOOL OF ENGINEERING

### 041-2 MECHANICAL DRAWING

*Curriculum: I, IV*  
*First year, second semester*

*Preparation: 041-1*  
*Four hours per week*

A continuation of Mechanical Drawing 041-1, comprising problems in conic sections, isometric drawing and tracing.

PROFESSORS ASHLEY AND GEE.  
MR. GRAMSTORFF.

### 041-3 MECHANICAL DRAWING

*Curriculum: II, III, V*  
*First year, second semester*

*Preparation: 041-1*  
*Nine hours per week*

A continuation of Mechanical Drawing 041-1 comprising problems in conic sections, isometric drawing, tracing and elementary machine drawing.

PROFESSORS ASHLEY AND GEE.  
MR. GRAMSTORFF.

### 042-3 MACHINE DRAWING

*Curriculum: II, V*  
*Second year, first semester*

*Preparation: 041-3*  
*Six hours per week*

Reading and translating drawings. Detailed and assembly drawings of machine parts and simple machines are made from freehand sketches and other data, but nothing in the nature of a copy is permitted. Designed to give a thorough foundation for the study of machine design.

PROFESSORS ASHLEY AND GEE.  
MR. GRAMSTORFF.

### 042-5 ENGINEERING DRAWING

*Curriculum: I, III,\* IV*  
*Third year, summer term*

*Preparation: 041-2 or 041-3*  
*Twenty-five hours per week*

This course comprises problems in mechanical and free-hand perspective, elementary machine drawing, freehand machine sketching and problems and class room discussions on simple mechanism of machines.

PROFESSOR ASHLEY.

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\*Second year, summer term.

## PROGRAM OF STUDIES

### 043-1 DESCRIPTIVE GEOMETRY

*Curriculums: I, II, III, V*

*Preparation: 041-1*

*First year, summer term*

*Twenty hours per week*

A study of the principles of descriptive geometry and their application to engineering by the solution of many problems in which theory and practice are closely correlated. Classroom exercises are devoted entirely to drafting board problems, preparation for which is obtained by the outside study of text-book references and practical problems.

PROFESSORS ASHLEY AND GEE.

### 044-2 MECHANISM

*Curriculums: II, V*

*Preparation: 041-3*

*Second year, first semester*

*Two hours per week*

An introductory course conducted mainly by graphical methods and dealing with gear trains, velocity ratios, paths of mechanical movements and their application to velocity diagrams, quick-return mechanisms, and cams.

PROFESSOR ASHLEY.

### 044-3 MECHANISM

*Curriculums: II, V*

*Preparation: 044-2*

*Second year, second semester*

*Six hours per week*

A continuation of Mechanism 044-2, embracing a careful study of gear-tooth outlines.

PROFESSOR ASHLEY.

## General Engineering

### 050-1 ENGINEERING CONFERENCE

*All curriculums*

*Preparation: — —*

*Second, third and fourth years:  
both semesters*

*Two hours per week*

The connecting link between the industry and the classroom. The second, third and fourth-year men of each curriculum meet in four separate groups for nine of the ten meetings, during each period. Each student, in turn, gives a thirty to forty-five minute talk on some particular topic of engineering interest. This talk then becomes the subject of

## SCHOOL OF ENGINEERING

discussion by the whole class, and the problem is considered in as much detail as seems best to the instructor.

For the tenth meeting of each period all courses meet together in Bates Hall and hear some speaker on a technical subject of live interest to all engineering students.

The marks for the reports written each period while at work, and the marks for the individual talk, are averaged in due proportion to find the grade due the student.

PROFESSORS NIGHTINGALE, ALVORD, DURKEE AND ZELLER.  
MR. PERKINS.

### 052-1 THESIS

*All curriculums*

*Fourth year, both semesters*

*Preparation: Technical subjects*

*One hour per week*

Each student who is a candidate for graduation must, during his senior year, prepare and present a thesis, the satisfactory completion of which is a pre-requisite for receiving a degree from the School of Engineering. By "thesis" is meant an essay involving the statement, analysis, and solution of some problem in pure or applied science. Its purpose is to demonstrate a satisfactory degree of initiative and a power of original thought and work on the part of each candidate for an engineering degree.

The subject of the thesis is to be decided in conference between the candidate and that faculty member of the professional department to whom he is assigned for supervision in thesis work, final approval, however, resting with the head of the department. This subject may be one of structural design, research, testing, study of a commercial process, etc., but in no case would a mere resumé of prior knowledge and a discussion of the present state of the matter be acceptable. This, it is true, must normally be made, but in addition thereto there must be a certain amount of work planned and executed, aimed toward the extension of the present field of information as regards the subject chosen.

In many cases the student presents an individual thesis. However, in nearly equal number, acceptable subjects will be found necessitating the co-operation of at least two men, either of the same or sometimes of different professional

## PROGRAM OF STUDIES

departments. In such cases, each man is primarily responsible for a certain part of the work, while also making himself wholly familiar with the entire problem; and the completed thesis must show clear evidence of the evenly-balanced co-operation and labor of the men concerned.

The completed thesis will be examined for acceptance or rejection from the technical viewpoint by the professional departments interested, and then forwarded to the Dean's office, the final approval of the thesis resting with the Dean.

Upon acceptance, the thesis becomes the property of the School of Engineering, together with all apparatus and material used in connection therewith, except that hired or borrowed, or which was already the personal property of the candidate. It is not to be printed, published, nor in any other way made public except in such manner as the professional department and the Dean shall jointly approve.

For all further information, the candidate for the degree is referred to the "Directions for Theses," which he must obtain from his professional department at the beginning of his senior year.

The arrangement of hours shown in the curriculums may be varied to suit the requirements of each department.

### Physical Education

#### 060-1 PHYSICAL TRAINING

*All curriculums*

*First year, both semesters*

*Preparation: — —*

*Two hours per week*

All first-year students are required to take Physical Training. Health, strength, and vitality do not come by chance, but by obedience to natural laws. It is very essential for the students to acquire good habits of life. The work in the gymnasium is of the body building type, with plenty of competition. Regular classes in calisthenics are held under an able physical instructor.

Students who are members of the Varsity Squads in any of the major sports may be excused from Physical Training upon petition to the Faculty, providing the petition is supported by the certification of the Athletic Coach and Physical Director. Upon petition of a student to be excused from Physical

## SCHOOL OF ENGINEERING

Training, owing to physical disability, favorable action will be taken by the Faculty only when said petition is accompanied by a physician's certificate, verifying the disability.

MR. SINNETT.

### DEPARTMENT OF CIVIL ENGINEERING

#### 11-1 SURVEYING

*Curriculum: I*

*Preparation: -- --*

*First year, first semester*

*Two hours per week*

Lectures, recitations, and problem work in which the following subjects are considered: the chain, tape, compass, transit, and level, methods of making and computing both closed and random traverses, location of buildings and points.

MR. INGALLS.

#### 11-2 SURVEYING

*Curriculum: I*

*Preparation: 11-1*

*First year, second semester*

*Two hours per week*

Surveying for deeds, city surveying, U. S. system of public land surveying, differential and profile leveling, theory and use of contour maps, stadia methods and various special problems.

MR. INGALLS.

#### 11-3 SURVEYING: FIELD-WORK AND PLOTTING

*Curriculum: I*

*Preparation 11-1*

*taken concurrently*

*First year, first semester*

*Five hours per week*

Two afternoons per week are devoted to preliminary practice with the standard surveying instruments. The work depends upon, and is closely allied to, the theoretical work in 11-1. The student first practises taping and chaining, then learns to use the compass for reading magnetic bearings. Next he runs a closed compass and tape traverse. Then follows practice with the transit level, and tape, concluding with a large transit and tape closed traverse. This traverse is balanced, plotted, and completed as a map. This includes the location and plotting of streets, buildings, etc., included within the traverse. Work is done on contour maps, with

## PROGRAM OF STUDIES

problems; differential and profile leveling; stadia methods; and various special problems such as layout of line and grade for a sewer or a building.

MR. INGALLS AND ASSISTANTS.

### 11-4 SURVEYING, FIELD-WORK AND PLOTTING

*Curriculum: I*

*Preparation: 11-2  
taken concurrently*

*First year, second semester*

*Five hours per week*

A continuation of Surveying 11-3.

MR. INGALLS AND ASSISTANTS.

### 11-5 SURVEYING

*Curriculum: I*

*Preparation: 11-3, 11-4*

*Second year, first semester*

*Two hours per week*

The student is taught the theory of plane and geodetic triangulation, the theory of the sextant, the theory of plane table topographical surveying, the adjustments of instruments, and the methods of stellar observation for the determination of azimuth. Surveying problems in review of the elementary work are assigned to make sure that the student has a comprehensive and accurate knowledge of the art.

MR. INGALLS.

### 11-6 SURVEYING, FIELD AND PLOTTING

*Curriculum: I*

*Preparation: 11-5  
taken concurrently*

*Second year, first semester*

*Five hours per week*

The work follows closely and is dependent upon the theoretical work of 11-5. Actual practise is given in triangulation, work with the sextant, plane table, field adjustment of instruments and in making an observation on polaris for latitude and azimuth.

MR. INGALLS.

### 11-7 SURVEYING

*Curriculum: V*

*Preparation: — —*

*First year, first semester*

*Three hours per week*

Lectures, recitations, and problems designed to give the students in Administrative Engineering instruction in the essential principles of surveying. A part of the time will be devoted to the illustration of these principles with the aid of the transit and level.

PROFESSOR ALVORD.

## SCHOOL OF ENGINEERING

### 11-8 TOPOGRAPHICAL DRAWING

*Curriculum: I, V<sub>1</sub>*

*Preparation: 11-3, 11-4*

*Third year, first semester*

*Three hours per week*

The course is devoted to the study of the conventional signs used in topographical drawing. Proficiency is sought in the use of the lettering pen, contour pen, ink and water color in map work. The various uses of a contour map are illustrated by problems in drawing.

PROFESSOR GEE.

### 12-1 RAILROAD SURVEYING

*Curriculum: I*

*Preparation: 11-5, 11-6*

*Second year, second semester*

*Three hours per week*

The course covers the principles and application of simple, compound, reversed, parabolic, and transition curves to railroad and highway location, also the principles of reconnaissance, preliminary and location survey for a railroad.

MR. INGALLS.

### 12-2 RAILROAD SURVEYING, FIELD WORK AND PLOTTING

*Curriculum: I*

*Preparation: 12-1*

*taken concurrently*

*Second year, second semester*

*Five hours per week*

The work follows closely the theory of 12-1. It includes the layout in the field of various railroad curves; the reconnaissance, preliminary and location survey of a line of railroad. Drafting room problems on location of railroads and highways from existing contour maps are given.

MR. INGALLS AND ASSISTANTS.

### 12-3 RAILROAD ENGINEERING

*Curriculum: I*

*Preparation: 12-1, 12-2*

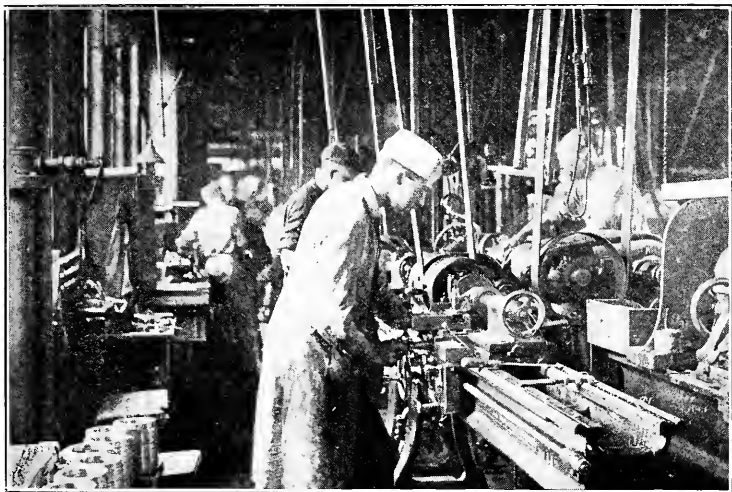
*Third year, first semester*

*Two hours per week*

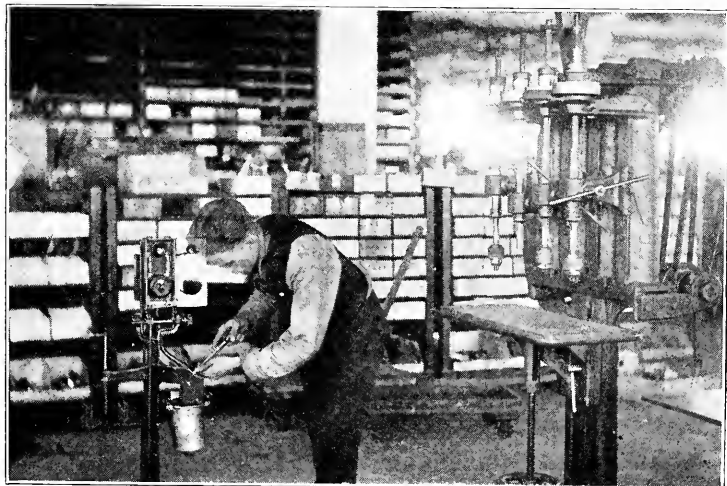
The work is a continuation of 12-1. Methods of computing excavation and embankment, including the use of tables and diagrams, are studied in detail. Further study is devoted to the effect of haul, and the use of the mass diagram in the determination of the final location. The economics of railroad location are considered.

MR. INGALLS.

## Mechanical Engineering Students

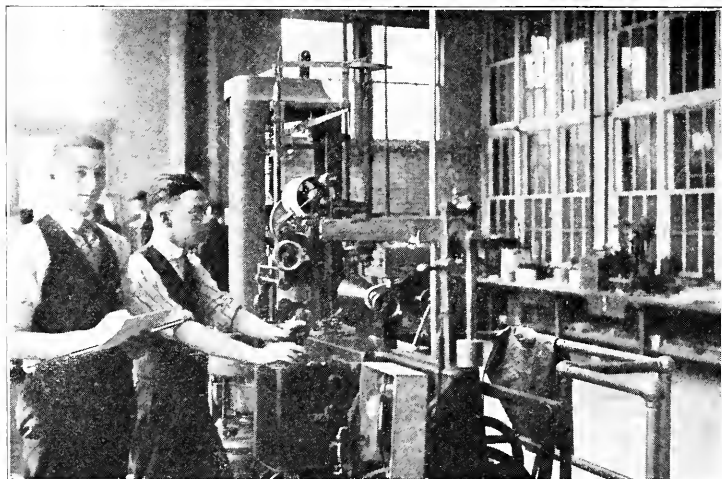


Finishing Castings  
BLANCHARD MACHINE COMPANY, CAMBRIDGE

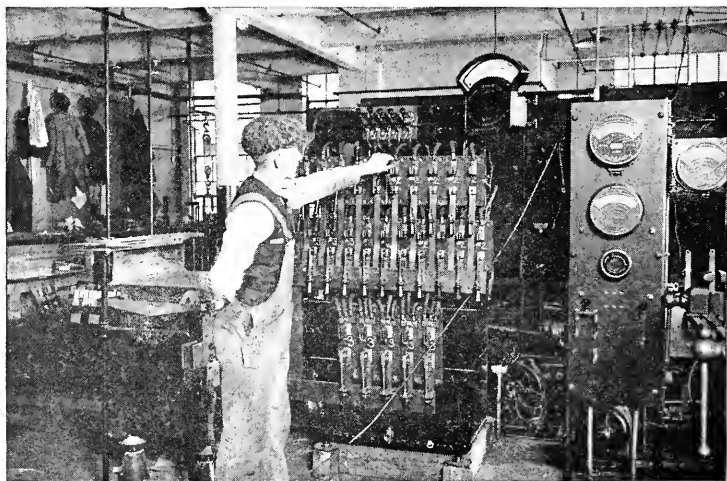


Assembling Machines  
UNITED SHOE MACHINERY CORPORATION, BEVERLY

# Electrical Engineering Students



Testing Materials  
GENERAL ELECTRIC COMPANY, LYNN



Testing a 10,000 Ampere Storage Battery Control Panel  
CONDIT ELECTRICAL MANUFACTURING COMPANY

## PROGRAM OF STUDIES

### 12-4 RAILROAD ENGINEERING, FIELD WORK AND PLOTTING

*Curriculum: I*

*Preparation: 12-3  
taken concurrently*

*Third year, first semester*

*Five hours per week*

Field work in connection with 12-3. The final location and profile of the railroad line is plotted, including the vertical, horizontal, and transition curves. A mass diagram is drawn for the earthwork, and a final computation of cost is made. The line is cross-sectioned and slope-staked.

MR. INGALLS AND ASSISTANTS.

### 13-1 HYDRAULICS

*Curriculums: I, II, V<sub>1</sub>  
Third year, first semester*

*Preparation: — —  
Three hours per week*

A study of the principles of both hydrostatics and hydrodynamics. The subjects considered are: the pressures on submerged areas together with their points of application; the laws governing the flow of fluids through orifices, short tubes, nozzles, weirs, pipe lines and open channels; and the dynamic action of water flowing over both stationary and moving curved surfaces. A short study of stream flow measurements is also included.

PROFESSOR DURKEE.

### 13-2 HYDRAULIC MOTORS

*Curriculums: II, III\*  
Third year, second semester*

*Preparation: 13-1 or 13-3  
Two hours per week*

Principles underlying the design of hydraulic turbines and motors. A complete study is also made of stream flow, storage and other details relating to hydraulic installations.

PROFESSOR ZELLER.

### 13-3 HYDRAULICS

*Curriculums: III, IV, V<sub>2</sub>†  
Third year, second semester*

*Preparation: — —  
Two hours per week*

Similar to Hydraulics 13-1, but adapted to the special needs of the students in these curriculums.

PROFESSOR DURKEE.

\*Fourth year, first semester.

†Fourth year, second semester.

## SCHOOL OF ENGINEERING

### 14-1 THEORY OF STRUCTURES

*Curriculum: I, V<sub>1</sub>*

*Third year, second semester*

*Preparation: 21-3*

*Three hours per week*

Class and drawing-room work in studying the loads, reactions, shears, and moments acting upon structures of various kinds, such as roofs and bridges. A thorough study is also made of the various functions of the influence line; the methods used to determine the position of moving loads to produce maximum shears and moments on bridges; and the design of beams.

PROFESSOR ALVORD.

### 14-2 STRUCTURAL DRAWING

*Curriculum: I, V<sub>1</sub>*

*Third year, second semester*

*Preparation: 21-3, 041-1*

*Three hours per week*

Drawing of standard sections of structural steel shapes and connections, and the preparation of drawings representing elementary structural details. The course is designed to familiarize the student with the designing and drawing of riveted connections, and the dimensioning and detailing of structural parts.

PROFESSOR ALVORD.

### 14-3 ENGINEERING STRUCTURES

*Curriculum: I, V<sub>1</sub>*

*Fourth year, both semesters*

*Preparation: 14-1, 14-2*

*Six hours per week*

The computation and design of structures of wood, steel, and masonry by analytical and graphical methods. The subjects considered are: plate girders, roof and bridge trusses of various types, such as simple trusses, bridge trusses with secondary web systems—including Baltimore and Pettit trusses—and trusses with multiple web systems, lateral and portal bracing, transverse bents, viaduct towers, and cantilever bridges. A study is also made of the design of columns, tension members, pin and riveted truss joints, trestles of wood and steel, masonry dams, retaining walls, and arches. The student is also given training in the use of the standard handbooks in structural work. The object is to train the student thoroughly in the application of mechanics to the design of structure.

PROFESSOR ALVORD.

## PROGRAM OF STUDIES

### 14-4 STRUCTURAL DESIGN

*Curriculum: I, V<sub>1</sub>*

*Preparation: 14-3,  
taken concurrently*

*Fourth year, both semesters*

*Six hours per week*

Designing and detailing of structures, using the theory learned in Engineering Structures 14-3. Complete working drawings are ordinarily made of a single track plate girder railroad bridge, a riveted truss highway bridge, and a small concrete arch.

PROFESSOR ALVORD.

### 15-1 CONCRETE

*Curriculum: I, II*

*Preparation: 21-3*

*Fourth year, both semesters*

*Two hours per week*

Concrete as a material of construction is studied in detail, and the principles of reinforced concrete design are learned. Computations and designs are made of flat slabs, T beams, columns, footings, retaining walls, and arches.

PROFESSOR ALVORD.

### 15-2 CONCRETE DESIGN

*Curriculums: I, II*

*Preparation: 15-1,  
taken concurrently*

*Fourth year, both semesters*

*Three hours per week*

Detailing and making of complete working drawings of the concrete structures designed in Concrete 15-1.

PROFESSOR ALVORD.

### 16-1 MATERIALS

*Curriculums: I, II, V<sub>2</sub>*

*Preparation: 21-3*

*Fourth year, first semester*

*Two hours per week*

A detailed study is made of the methods of manufacturing, properties, and uses of materials used in engineering work; such as iron and steel, lime, cement, concrete, brick, wood and stone. Methods of testing and strength of various materials used by the engineer are also taken up. Each student is required to prepare, and present to the class, a paper on some subject of especial importance, which is assigned by the instructor.

MR. STEARNS.

## SCHOOL OF ENGINEERING

### 16-2 TESTING MATERIALS LABORATORY

*Curriculum: I, V<sub>1</sub>*

*Preparation: 12-3*

*Third year, second semester*

*Two hours per week*

The work is done by the students and includes tests to determine the elongation, reduction of areas, modulus of elasticity, yield point, ultimate compressive strength of metals, such as steel, cast iron, copper and brass; tensile and compressive tests on timber and concrete; tests to determine the deflection, modulus of elasticity, elastic limit, and ultimate transverse strength of steel and wooden beams, subject to transverse loads. Tests are also made on cement mortars to determine the strength of cubes and briquettes at different ages.

PROFESSOR ALVORD.

### 16-3 FOUNDATIONS

*Curriculum: I*

*Preparation: 14-1, 16-1,  
taken concurrently*

*Fourth year, first semester*

*Two hours per week*

The subjects treated are pile formations—including those of timber and concrete—sheet piles, coffer-dams, box and open caissons, pneumatic caissons, pier foundations in open wells, bridge piers, and abutments.

PROFESSOR GEE.

### 16-4 GEOLOGY

*Curriculum: I, V<sub>1</sub>*

*Preparation: — —*

*Third year, first semester*

*Two hours per week*

Earth movements and the various terrestrial applications of solar energy. The more important geological processes, erosion, sedimentation, deformation, and eruption are taken up and discussed. The latter part of the course is devoted to lectures on the broader structural features of the earth's crust and the application of the principles of structural geology to practical engineering problems.

PROFESSOR PUGSLEY.

### 17-1 HIGHWAY ENGINEERING

*Curriculum: I*

*Preparation: 11-2*

*Fourth year, second semester*

*Two hours per week*

The location, construction, and maintenance of roads, street design, and street drainage; sidewalks; pavement foundations; and the construction, cost and maintenance

## PROGRAM OF STUDIES

of the various kinds of roads and pavements, including asphalt, brick, stone-block, wood-block, macadam (both water bound and bituminous), bituminous concrete, hydraulic cement concrete, gravel, and earth. Special consideration is given to the modern concrete road.

PROFESSOR GEE.

### DEPARTMENT OF MECHANICAL ENGINEERING

#### 21-1 APPLIED MECHANICS (STATICS)

*All curriculums*

*Preparation: 022-1, 031-1*

*Second year, first semester*

*Three hours per week*

The topics covered are: forces in equilibrium, parallel forces, stresses in frames and forces in three dimensions. The student is required to solve a large number of problems, and to pass examinations at frequent intervals. It is felt that the student should retain a considerable body of facts about this subject in his mind after graduation; therefore a thorough groundwork of theory is covered.

PROFESSOR BENEDICT,  
MR. STEARNS.

#### 21-2 APPLIED MECHANICS (KINETICS)

*All curriculums*

*Preparation: 21-1*

*Second year, second semester*

*Three hours per week*

A continuation of Applied Mechanics 21-1 covering center of gravity, moment of inertia, radius of gyration, kinematics of harmonic motion and pendulums, and kinetics of translation and rotation.

PROFESSOR BENEDICT,  
MR. STEARNS.

#### 21-3 STRENGTH OF MATERIALS

*Curriculums: I, II, V*

*Preparation: 21-2*

*Third year, both semesters*

*Three hours per week*

The topics covered are: the theory and experimental basis of tension, compression, shear, resilience, modulus of elasticity, bending stresses, the design of beams, moment and shear diagrams, use of tables of standard steel shapes, longitudinal shear and deflection in beams, combined stresses, beams with three supports, columns, the strength of shafts and springs, and principal stresses.

PROFESSOR BENEDICT.

## SCHOOL OF ENGINEERING

### 21-4 STRENGTH OF MATERIALS

*Curriculums: III, IV*

*Preparation: 21-1*

*Third year, first semester*

*Three hours per week*

Similar to Strength of Materials 21-3, but more limited in time. The topics omitted are columns, principal stresses, and longitudinal shear and deflection in beams.

PROFESSOR BENEDICT.

### 22-1 GRAPHICAL ANALYSIS

*Curriculum: II, V<sub>2</sub>*

*Preparation: 042-4, 044-3, 21-2*

*Third year, first semester*

*Six hours per week*

Many problems which may readily be solved by graphical methods are included here. Valve gear problems are solved by the use of the various diagrams. The kinematical features of various machines are studied by means of velocity and acceleration diagrams.

PROFESSOR FERRETTI.

### 22-2 MACHINE DESIGN

*Curriculum: II, V<sub>2</sub>*

*Preparation: 21-3,*

*taken concurrently*

*Third year, second semester*

*Six hours per week*

An application of the principles studied in Applied Mechanics and Mechanism to the design of machine parts. The problem work of the course consists mainly in the design of a steam boiler as the stresses for such a design are known to a great degree of certainty, and the materials of construction are very reliable.

PROFESSOR FERRETTI.

### 22-3 MACHINE DESIGN

*Curriculum: II, V<sub>2</sub>*

*Preparation: 22-2*

*Fourth year, both semesters*

*Six hours per week*

Further practice is given the student in the application of theoretical principles previously studied, and at the same time he becomes familiar with the many practical details which must be considered in design work. The problems taken up in the early part of the course are of a static nature, while the later problems involve dynamical stresses. The prob-

## PROGRAM OF STUDIES

lems vary from year to year, but the following are typical of the designs taken up: hydraulic press, arbor press, hydraulic flanging clamp, crane, air compressor, punch and shear, stone-crusher, etc.

In each design, the constructive details are carefully considered, with special attention to methods of manufacture, provision for wear, lubrication, etc. The work is based on rational rather than empirical methods, the student being required to make all calculations for determining the sizes of the various parts and all necessary working drawings.

PROFESSOR FERRETTI.

### 22-5 MECHANISMS OF MACHINES

*Curriculum: II*

*Third year, second semester*

*Preparation: 044-3*

*Three hours per week*

Designed to supplement the work in pure mechanism as given in course 044-3, by a consideration of the application of mechanisms to actual machines, thereby furnishing the student with a series of practical mechanisms to accomplish definite purposes, and increasing his ability to analyze the action of other machines.

PROFESSOR FERRETTI.

### 23-1 HEAT ENGINEERING

*Curriculums: II, III, V<sub>2</sub>*

*Third year, both semesters*

*Preparation: 023-2, 033-1*

*Three hours per week*

The fundamental principles underlying the subject of thermodynamics. A study is made of the following topics: the properties of perfect gases, saturated and super-heated vapors, air and steam cycles, and the flow of fluids through nozzles, and pipe-lines, and the calculations of an air compressor. In the second half-year the principles of thermodynamics are applied to the various parts of the modern steam power plant. This includes a study of boilers, fuels, and combustion, flue gas analysis, feed-water heaters, chimneys, steam engines, condensers, cooling towers, gas power, steam turbines, and also the methods of testing power plant equipment.

PROFESSOR FERRETTI.

## SCHOOL OF ENGINEERING

### 23-2 ENGINEERING LABORATORY

*Curriculum: III*

*Preparation: 23-1*

*Fourth year, first semester*

*Two hours per week*

A short series of tests and exercises upon the various appliances in use in modern power plants. The students here apply the knowledge they have gained in the class room, making a complete report of the test, including methods of testing and computations.

PROFESSORS FERRETTI AND ZELLER.

### 23-3 HEAT ENGINEERING

*Curriculums: I, IV*

*Preparation: 023-2, 033-1*

*Third year, second semester*

*Three hours per week*

The subject matter of heat engineering is presented to the students of civil and chemical engineering to meet their special needs.

PROFESSOR FERRETTI.

### 23-4 STEAM TURBINES

*Curriculum: II*

*Preparation: 23-1*

*Third year, summer term*

*Five hours per week*

A study of the principles of the flow of fluids, kinetic effects, and thermodynamics with the steam turbine used as a current example. The fundamental differences in the principle of the different types of turbines; the field of application of the steam turbine; and the influence of high vacuum together with the condensing equipment developed for turbine work, are all given careful attention.

PROFESSOR ZELLER.

### 23-5 HEAT ENGINEERING

*Curriculum: II*

*Preparation: 23-1*

*Fourth year, first semester*

*Three hours per week*

A study of the various systems of refrigeration, such as the ammonia absorption and compression machines, constitutes the major portion of the course. A brief study is also made of the principles of heating and ventilation, and of Hirn's analysis of the losses in a steam engine.

PROFESSOR FERRETTI.

## PROGRAM OF STUDIES

### 23-6 ENGINEERING LABORATORY

*Curriculum: II*

*Preparation: 23-1*

*Third year, summer term*

*Fifteen hours per week*

Similar to Engineering Laboratory 23-2, but covering the ground more completely than was possible with the limited time available in that course.

PROFESSORS FERRETTI AND ZELLER.

### 24-1 PRODUCTION ENGINEERING

*Curriculums: II, V*

*Preparation: — —*

*First year, first semester*

*Two hours per week*

A descriptive course intended to acquaint the student with the organization, methods, and equipment used in industrial plants engaged in quantity production. For purposes of discussion the plant is divided into its various units: such as general offices, drafting-room, pattern-shop, foundry, machine-shop, erecting shop, testing-room, etc. The mechanical equipment, filing systems, cost-keeping systems, "follow-up" cards, etc., are described, and representative examples are shown.

PROFESSOR ZELLER.

### 24-2 PRODUCTION ENGINEERING

*Curriculums: II, V*

*Preparation: 24-1*

*First year, second semester*

*Two hours per week*

A continuation of Production Engineering 24-1.

PROFESSOR ZELLER.

### 24-3 POWER PLANT EQUIPMENT

*Curriculum: II*

*Preparation: 23-1*

*taken concurrently*

*Third year, first semester*

*Two hours per week*

Largely a description of the many appliances used in modern power plants. A discussion of boilers and boiler accessories, ash and coal handling systems, the various types of engines—gas engines and turbines—with their valve gears and governing devices, condensers, feed-water heaters, pumps, etc.

PROFESSOR ZELLER.

## SCHOOL OF ENGINEERING

### 24-4 POWER PLANT ENGINEERING

*Curriculum: II, V<sub>2</sub>*

*Fourth year, second semester*

*Preparation: 23-1*

*Three hours per week*

Topics and problems chosen largely from engineering practice selected to convey to the engineering students a firm grasp of fundamental principles and engineering methods of attacking and analyzing problems in power plant, not only from the point of view of scientific theory, but also with due consideration of the limitations imposed by practice and by costs. Efficiency and operation costs of different types of plants such as steam, hydro-electric and Diesel engines are also carefully studied to determine the type of plant best suited for the conditions and location involved.

PROFESSOR ZELLER.

### 24-6 STANDARD ENGINEERING PRODUCTS AND PROCESSES

*Curriculums: II, III*

*Fourth year, second semester*

*Preparation: 16-1*

*Two hours per week*

Intended to familiarize the student with the commercial names and sizes of engineering products: such as, bar and plate stock, shafting, tubing, pipes, valves, bearings and hangers, belts, pulleys, etc. A discussion of such manufacturing processes as extrusion, broaching, press work, electric and oxy-acetylene welding, cold and hot rolling and drawing, etc., is included.

PROFESSOR ZELLER.

### 25-1 INDUSTRIAL PLANTS

*Curriculum: II, V<sub>2</sub>*

*Fourth year, first semester*

*second semester*

*Preparation: 21-3, 24-2*

*Four hours per week*

*Six hours per week*

The principles involved in the erection, installation, and management of an industrial plant. A description of the different types of structures, with consideration of such details as foundations, walls, columns, floors, windows, etc., is followed by a discussion of the installation of the power plant and machinery. Principles of illumination, fire-prevention, heating and ventilation, routing of materials, and the organization and management of a plant are taken up. Design problems are given in connection with the course.

PROFESSOR ZELLER.

## PROGRAM OF STUDIES

### DEPARTMENT OF ELECTRICAL ENGINEERING

#### 30-1 ELEMENTS OF ELECTRICITY

*Curriculums: I, II, IV, V*  
*Second year, first semester*

*Preparation: 022-1, 031-1*  
*Three hours per week*

The foundation for subsequent electrical engineering work for students of Civil, Mechanical, and Chemical Engineering. Emphasis is laid on the fundamental principles, and the subject is developed by elaborating these principles through numerical applications. The topics discussed are, briefly: magnets and magnetism, electrical resistance and Ohm's law, electric work and power, series and parallel circuits, electro-magnetism, electromagnetic induction, magnetic properties of iron, electrolysis and batteries, alternating currents and voltages, inductance, capacitance, and circuits containing resistance, inductance, and capacitance.

MR. PORTER.

#### 30-3 APPLIED ELECTRICITY

*Curriculums: I, II, IV, V*  
*Second year, second semester*

*Preparation: 30-1*  
*Three hours per week*

The object is to fit the student to handle intelligently electrical problems that are likely to come up in connection with his chosen field. The course varies somewhat in content, depending upon the particular branch of engineering which most of the students in the class are studying. In any case, the first period is devoted to a consideration of various direct-current machines and appliances; their characteristics and applications. In the second period alternating-current apparatus is treated in a similar manner.

MR. PORTER.

#### 30-4 APPLIED ELECTRICITY LABORATORY

*Curriculums: I, II, IV, V*  
*Second year, summer term*

*Preparation: 30-3*  
*Twenty-five hours per week*

The characteristics and operation of direct and alternating current machinery, discussed in Course 30-3. The experiments deal with the following: resistance measurement, speed control direct-current motors; voltage control of generators; voltage regulation of direct-current generators; speed regulation of direct-current motors; brake tests of various types of direct and alternating-current motors; measurement of losses and the calculating of the efficiency

## SCHOOL OF ENGINEERING

of motors and generators; alternating current circuits containing resistance, inductance, and capacitance; determination of the characteristics of transformers; various polyphase connections; regulation of alternators; synchronous motor, rotary converter, and induction motor characteristics. A written report is required on each experiment, and especial care is exercised that such reports be correct in manner and in form.

MR. PORTER.

### 31-1 ELEMENTS OF ELECTRICAL ENGINEERING

*Curriculum: III*

*Preparation: — —*

*First year, first semester*

*Two hours per week*

A descriptive discussion of the fundamental principles of electrical practice, combined with an outline of their application in the art. The principal aim is to familiarize the student as soon as possible with those matters with which it is important he should be acquainted, in order that he may from the beginning obtain the most possible from his Engineering Practice.

PROFESSOR SMITH.

### 32-1 ELECTRICAL ENGINEERING I

*Curriculum: III*

*Preparation: 31-1, 40-1*

*First year, second semester*

*Four hours per week*

A study in detail of the electric current, electromotive force and resistance, electrical work and power, electrical circuits, Kirchhoff's laws, primary and secondary batteries, magnetism, electromagnetism, electromagnetic induction, self and mutual inductance, electrostatics, energy stored in the electromagnetic and electrostatic field. The practical units of measurement are discussed, as the several quantities to which they apply are successively reached. The work includes demonstration and simple experimentation arranged to enforce the principles discussed theoretically.

MR. PORTER.

### 32-3 ELECTRICAL ENGINEERING II

*Curriculum: III*

*Preparation: 022-1, 32-1*

*Second year, first semester*

*Three hours per week*

*second semester*

*Four hours per week*

A careful, though more or less descriptive, discussion of the dynamo in general operating both as generator and motor, armature windings, armature reactions and their compen-

## PROGRAM OF STUDIES

sation, commutation, etc., followed by a thorough study of the direct-current machine from the point of design, during the first semester; and, during the second semester, a consideration of the methods of testing for efficiency and performance followed by some examination of the applications of the machines studied, as, parallel operation, three-wire systems, boosters and balancers, special motor applications and control methods.

Much emphasis is placed upon the working out of practical problems, a special weekly period being allowed during the second semester for this purpose and about one hundred problems worked in the class room.

PROFESSOR SMITH.

### 32-4 ELECTRICAL ENGINEERING II, LABORATORY

*Curriculum: III*

*Preparation: 32-3,  
taken concurrently*

*Second year, both semesters*

*Six hours per week*

A carefully-selected series of experiments intended to exemplify qualitatively, and in the clearest manner, the principles developed in the parallel lectures, 32-3. It includes a series of about twenty experiments, of which the following may be mentioned as illustrative of the type of work:

The starting of a shunt motor, and starting devices.

The speed, field, and voltage relations in a separately excited machine.

The heat test of a generator.

The characteristic curves of generators.

The parallel operation of shunt and compound generators.

The three-wire balancer set.

The speed and torque curves of the series motor.

Satisfactory completion of fifteen experiments is the minimum acceptable amount of work.

Since the purpose of the course is in part to develop correct methods of work, it is intended that the whole of the preparatory work, as well as the working up of the data obtained, shall be done in the laboratory under supervision of the instructor, so far as necessary.

MR. PORTER.

## SCHOOL OF ENGINEERING

### 32-6 ELECTRICAL ENGINEERING III, LABORATORY

*Curriculum: III*

*Preparation: 32-4, and 32-7 and  
33-1, taken concurrently*

*Third year, both semesters*

*Six hours per week*

A series of experiments involving the testing of machines; together with experiments intended to elucidate practically the principles developed in the parallel course on alternating currents, 32-7, and also to train the student in the use of the special types of instruments which he will later use in the laboratory work upon alternating current machinery.

Illustrative experiments are:

Stray power tests, Prony brake tests, retardation tests, pumping back tests, regulation tests, heat runs, analysis of losses, etc.

Study of A-C series and parallel circuits, resonant conditions, effect of frequency change on circuit constants, parallel operation of A-C machines, synchronizing and changing load, power factor measurements, power measurement in polyphase circuits, etc.

As the course progresses, the student is thrown more and more upon his own resources; a desired result is stated to him, and he is left to plan out his own methods, settle upon the apparatus needed, solve his precision requirements, calibrate the instruments, if necessary, and finally turn in a detailed report covering all phases of the work from its inception.

PROFESSOR SMITH.

### 32-7 ELECTRICAL ENGINEERING III

*Curriculum: III*

*Preparation: 022-1, 32-3*

*Third year, both semesters*

*Three hours per week*

Lectures, recitations and problem work upon the electro-magnetic and electro-static fields and the theory of alternating currents. The course covers the consideration of the "steady state," both when we have a pure sine wave and when we have a complex wave. Transients are not considered. The subject is developed principally by the aid of vector algebra, and the student is urged to use the methods of complex quantity to the fullest extent.

Application of the principles developed to all possible combinations of resistance, inductive and condensive reactances

## PROGRAM OF STUDIES

in both single and polyphase circuits is given by the working of about two hundred problems involving both analytical and graphical methods.

### 32-8 ELECTRICAL ENGINEERING IV, LABORATORY

*Curriculum: III*

*Preparation: 32-9,  
taken concurrently*

*Fourth year, both semesters*

*Six hours per week*

Laboratory course to accompany Course 32-9 in alternating-current machinery. The work includes tests on the heating, efficiency, and determination of the characteristics of the various types of alternating-current machinery, such as transformers, generators, and motors. A detailed preliminary study is made of each assigned experiment, involving the theoretical principles, the method of procedure to obtain the required results, and the way in which the results should be worked up. This is embodied in a preliminary report. The student then does the necessary laboratory work to obtain the required data; and finally works up the whole into a detailed final report. The assistance given by the instructor is reduced to a minimum, the initiative and resourcefulness of the student being depended on to the greatest extent.

PROFESSOR DURKEE.

### 32-9 ELECTRICAL ENGINEERING IV

*Curriculum: III*

*Preparation: 023-2, 32-7*

*Fourth year, both semesters*

*Four hours per week*

A careful, thorough, and detailed discussion of the construction, theory, operating characteristics, and testing of the various types of alternating current machinery. The first half of the course is equally divided between the transformer and the synchronous generator. In the second half of the course synchronous motors, parallel operation of alternators, synchronous converters, polyphase induction motors, the induction generator, single phase induction motors, and commutating alternating-current motors are taken up. One two-hour period a week is spent in the solution of numerical problems.

PROFESSOR DURKEE.

## SCHOOL OF ENGINEERING

### 33-1 ELECTRICAL MEASUREMENTS

*Curriculum: III*

*Preparation: 32-3*

*Third year, both semesters*

*Two hours per week*

A brief discussion of measurement in general and electrical measurements in particular, in which a review of the electrical units and their definitions has a part. Resistance devices, galvanometers, ammeters, and voltmeters are next discussed, the treatment of other instruments being taken up later in connection with their uses. This is followed by a detailed discussion of the methods of measuring the various electrical quantities—resistance, resistivity, conductivity, current, electromotive force, capacitance, inductance, magnetic induction, permeability, hysteresis loss, energy, and power. The student is given a thorough discussion of the construction, theory of operation, method of use, sources of error, etc., of the types of measuring instruments used in commercial work and in the standardizing laboratory.

PROFESSOR DURKEE.

### 33-2 ELECTRICAL MEASUREMENTS LABORATORY

*Curriculum: III*

*Preparation: 33-1*

*Third year, second semester  
summer term*

*Three hours per week  
Twenty-five hours per week*

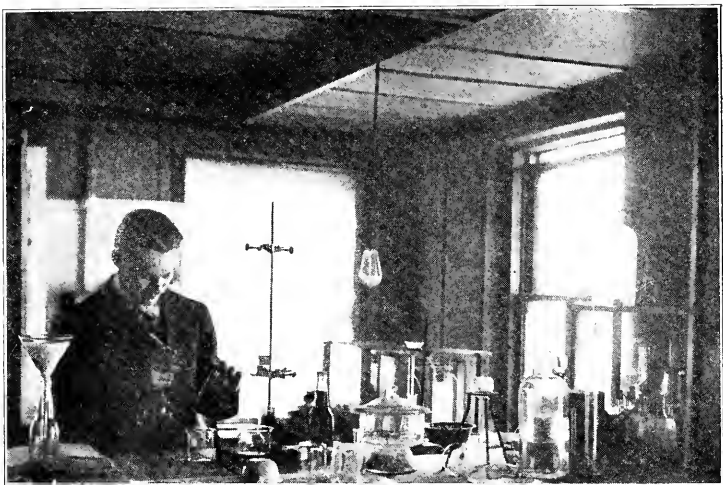
A series of experiments emphasizing the principles developed in Course 33-1. The student becomes familiar with the use of the standard apparatus in use in testing laboratories. Particular stress is laid on the correct use of the apparatus, and precision discussions are required throughout.

The experiments cover such matters as the measurement of resistance by various methods, resistivity, conductivity, electromotive force, current inductance, capacitance, magnetic induction, magnetizing force, hysteresis loss, etc. Work is given in calibrating ammeters, voltmeters and watt-hour meters, in cable testing, magnetic testing, wave form determination, and the use of special apparatus such as the Kelvin bridge, Carey Foster bridge, potentiometer, etc., and secondary laboratory standard instruments.

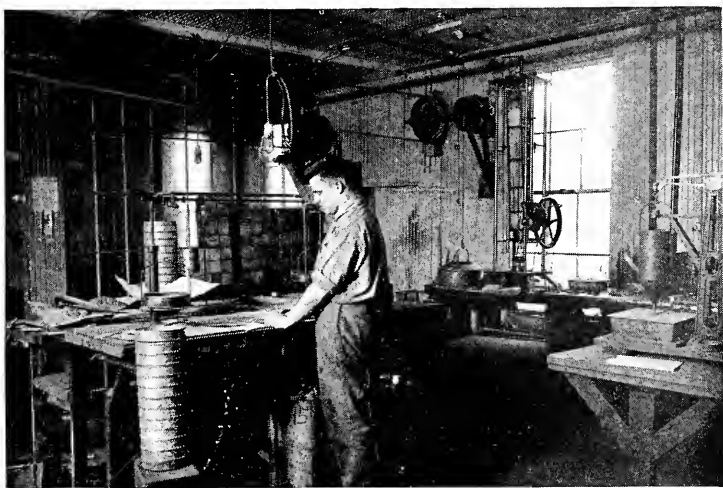
Thorough training in the principles of Precision of Measurements is also given, and applied to each experiment performed.

PROFESSOR DURKEE.

## Chemical Engineering Students



Analyzing Food  
A. B. WERBY LABORATORIES

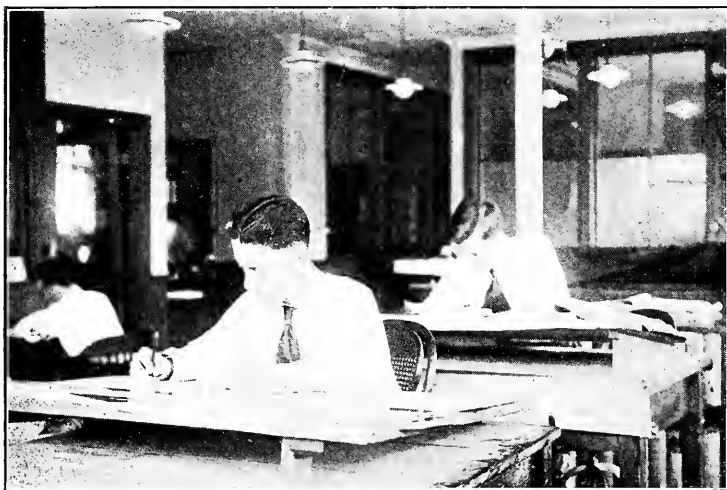


Testing Road Materials  
WARREN BROTHERS—PAVING MATERIALS

## Students Engaged in Engineering Practice



Drafting  
DESIGNING ENGINEER'S OFFICE—B. & A. RAILROAD



Machine Designing  
KINNEY MANUFACTURING COMPANY, BOSTON

## PROGRAM OF STUDIES

### 34-1 ELECTRICAL ENGINEERING V

*Curriculum: III*

*Preparation: 13-2, taken concurrently; 32-7, 32-9, taken concurrently*

*Fourth year, both semesters*

*Four hours per week*

A detailed study of the central station, both steam-driven and hydro-electric, equally careful attention being given to the engineering and economic details, the influence of the various appliances upon the cost of power being kept constantly in view.

Following this comes a careful study of the high tension transmission line, the potentials used, spacing of conductors, line characteristics, losses, inductive effects upon neighboring circuits, quarterwave transmission, surges, etc.

After this is considered the sub-station and equipment, and then follows a full discussion of distribution systems and the utilization of electrical power, especial attention being given to railway operation, and the matter of outdoor and interior illumination. The course closes with a brief discussion of the public utility in its relations to the community served.

PROFESSOR SMITH.

### 35-1 ADVANCED ELECTRICITY

*Curriculum: III*

*Preparation: 32-7*

*Fourth year, both semesters*

*Two hours per week*

This course consists of two parts: first, the matter of electro-magnetic radiation, the propagation of waves in space and along wires, and a detailed discussion of the theory of transients intended to supplement the more practical consideration of transmission lines given in course 34-1.

The latter part of the course is given over to a full descriptive discussion of modern electrical theory. Beginning with the state of electrical science in the time of Franklin, the development of the science is traced through the work of Faraday, Maxwell, Hertz and Kelvin on the one hand; of Weber, Crookes, J. J. Thomson, Millikan, and others on the other. The subjects of metallic, electrolytic, and gaseous conduction are discussed, together with ionization, the theories of electromagnetic mass, and the electrical constitution of matter.

PROFESSOR SMITH.

## SCHOOL OF ENGINEERING

### DEPARTMENT OF CHEMICAL ENGINEERING

#### 40-1 INORGANIC CHEMISTRY

*Curriculums: I\*, II, III*

*Preparation: — —*

*First year, first semester*

*Four hours per week*

Inorganic chemistry designed to meet the needs of students in non-chemical courses. A brief discussion of the general principles of chemistry as applied to engineering, with the idea of illustrating the applications of chemistry to special lines of engineering work.

PROFESSOR STRAHAN.  
MR. BAKER.

#### 41-1 INORGANIC CHEMISTRY

*Curriculum: IV*

*Preparation: — —*

*First year, both semesters*

*Four hours per week*

The fundamental principles of the science are taught by means of experimental lectures. Topics of a broad general character are taken up in the first part of the subject, in connection with the descriptive chemistry of the non-metallic elements, followed later by more specialized work in connection with the elements. Recitations will include a short written test on the two lectures of the week. Special attention is given to chemical calculations based on practical application.

PROFESSOR STRAHAN,

#### 41-2 INORGANIC CHEMISTRY LABORATORY

*Curriculum: IV*

*Preparation: 41-1*

*taken concurrently*

*First year, both semesters*

*Five hours per week*

The object is to cultivate scientific attitude and habit of thought on the part of the student, and to increase his power of acquiring knowledge, whether it be from book, lecture, or from experiment. The experiments are planned to illustrate the topics which have been discussed in the lecture room. Careful manipulations, thoroughness in observation, accuracy in arriving at conclusions, are required of each student. In this, as in all subsequent laboratory work, neat and satisfactory notes will be considered an essential part of the work.

PROFESSOR STRAHAN.  
MR. GREEN.

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\*Third year, second semester.

## PROGRAM OF STUDIES

### 42-1 QUALITATIVE ANALYSIS

*Curriculum: IV*

*First year, summer term*

*Preparation: 41-1, 41-2*

*Ten hours per week*

The course is designed not merely to consider the procedures used in the detection of the common elements, but to deal in a much broader way with the principles involved in chemical analysis and to broaden the student's knowledge of inorganic chemistry, especially the chemistry of the metallic elements. A great deal of time is devoted to the study of the principles of hydrolysis, solubility product, correct concentration, amphoteric substances, and the general laws of solutions. In the latter part of the course the analysis of unusual mixtures will be discussed with especial emphasis on the interpretation of analytical results.

MR. PERKINS.

### 42-2 QUALITATIVE ANALYSIS LABORATORY

*Curriculum: IV*

*First year, summer term*

*Preparation: 42-1*

*taken concurrently*

*Twenty-eight hours per week*

After a series of preliminary experiments illustrating principles and giving opportunity for practice in writing equations, the analysis of unknown substances is undertaken, beginning with solutions and simple salts, and later analyzing minerals, pigments, slags, alloys, and various commercial products, such as boiler compounds, cleaning powders, glass enamels, and similar inorganic substances.

MR. PERKINS.

### 43-1 QUANTITATIVE ANALYSIS

*Curriculum: IV*

*Second year, first semester*

*Preparation: 42-1, 42-2*

*Two hours per week*

The general principles of quantitative analysis. Half of the time is devoted to the consideration of typical methods in gravimetric analysis, such as the determination of chloride in salt, the determination of sulphur in sulphur compounds, the complete analysis of brass, and other analyses involving general principles of procedure. The other half of the time is devoted to the methods of volumetric analysis as illustrated in the use of acid and alkali determinations, oxidation methods involving bichromate, permanganate and iodine, and the

## SCHOOL OF ENGINEERING

methods of volumetric precipitation. Special attention is given to chemical calculations, and the solution of numerous analytical problems is one of the essential features of the course.

MR. PERKINS.

### 43-2 QUANTITATIVE ANALYSIS LABORATORY

*Curriculum: IV*

*Preparation: 43-1  
taken simultaneously*

*Second year, both semesters*

*Five hours per week*

Analytical practice illustrating the methods discussed in Course 43-1. The calibration of burettes, the use and care of analytical balances, and a limited number of typical gravimetric and volumetric analyses are included in the course, in which great stress is laid on the accuracy, care, and integrity necessary for successful quantitative work.

MR. PERKINS.

### 44-1 TECHNICAL ANALYSIS

*Curriculum: IV*

*Preparation: 43-1, 43-2*

*Third year, first semester*

*Three hours per week*

A continuation of course 43-1, dealing more specifically with actual technical or commercial analytical problems. Especial emphasis is placed upon actual methods used in industrial operations. Complete reports covering the history, theory, and actual routine work will be asked for from each student, upon each problem undertaken. In general, the course will include the rapid methods of analysis of steel, the analysis of boiler waters, gases, fuels, oils, paints, varnishes, and similar substances.

MR. PERKINS.

### 44-2 TECHNICAL ANALYSIS LABORATORY

*Curriculum: IV*

*Preparation: 44-1,  
taken concurrently*

*Third year, first semester*

*Five hours per week*

Designed to illustrate by a limited number of analyses the technical methods of quantitative analysis. Problems will be assigned individually, depending on the student's future plans or his inclination, and will be selected from the fields of

## PROGRAM OF STUDIES

steel analysis, gas and fuel analysis, including calorific testing, water analysis. Time is devoted to the study of pigments, soaps, or in general in the analysis of that class of materials in which the student is most interested.

MR. PERKINS.

### 44-3 TECHNICAL ANALYSIS

*Curriculum: IV*

*Preparation: 43-1, 44-1*

*Third year, second semester*

*Two hours per week*

This course is designed to cover in a brief manner the subject of metallography. The metallographic methods of investigation, including preparation of sample, etching, and microscopic examination will be discussed. A discussion of the more common non-ferrous alloys including bearing metals, type metals, solders, and brass will be undertaken by the interpretation of their temperature, composition diagrams and application to the Phase Rule. A portion of the time will also be devoted to the iron-carbon diagram, which will include the metallurgy and metallography of cast iron, malleable iron, carbon steels, and special steels.

MR. PERKINS.

### 45-1 ORGANIC CHEMISTRY

*Curriculum: IV*

*Preparation: 43-1 and 43-2,  
taken concurrently*

*Third year, both semesters*

*Three hours per week*

The underlying principles and theories of organic chemistry, the methods of preparation and characteristic reactions of carbon compounds. The important organic compounds will be considered in detail, because they serve as the most convenient examples for illustrating fundamental principles which elucidate the chemical character of substances which are of practical importance.

PROFESSOR STRAHAN.

### 45-2 ORGANIC CHEMISTRY LABORATORY

*Curriculum: IV*

*Preparation: 45-1,  
taken concurrently*

*Third year, both semesters*

*Five hours per week*

The operations, apparatus, and the laboratory technique involved in organic work, such as fractional distillation, extraction, crystallization, steam distillation, determinations

## SCHOOL OF ENGINEERING

of melting points, boiling points, and the like. It deals also with general methods of preparation, such as etherification, saponification, sulphonation, diazotization, etc. The student will prepare a number of compounds—including nitro-benzene, aniline, ethers, phenols, and other typical organic substances.

PROFESSOR STRAHAN.

### 45-3 ORGANIC CHEMISTRY

*Curriculum: IV*

*Fourth year, both semesters*

*Preparation: 45-1*

*Two hours per week*

A review of Course 45-1 is given, but the subject is studied from a more mature point of view to furnish the student a more thorough survey of the fundamental principles which underlie the modern developments in this branch of chemistry.

Emphasis is placed on the effect of the nature of organic radicals on the properties of the compounds containing them, the effect of unsaturation, and the influence of structure and substituents on the activity of groups and the laws of substitution.

Industrially important compounds are treated more at length than those of a more purely scientific use and of interest to the advanced students only.

During the latter part of the course outside reading will be assigned in the scientific journals, followed by reports and discussions.

PROFESSOR STRAHAN.

### 45-4 ORGANIC CHEMISTRY LABORATORY

*Curriculum: IV*

*Fourth year, both semesters*

*Preparation: 45-3*

*taken concurrently*

*Five hours per week*

Preparations and reactions of the typical organic substances, including the methods of separation and identification of simple mixtures. The instruction also includes a study of the qualitative tests for the important groups occurring in organic compounds, together with the other physical data which would give valuable information as to the nature of the compound under examination.

## PROGRAM OF STUDIES

The student is given several unknown pure compounds and mixtures to analyze which trains him to use his head as well as the information supplied in his text-books.

PROFESSOR STRAHAN.

### 46-2 CHEMICAL ENGINEERING

*Curriculum: IV*

*Preparation: — —*

*Third year, second semester*

*Two hours per week*

The study of basic principles such as the Law of Conservation of Elements, the Law of Conservation of Energy, and the Stoichiometrical Relationships of Solids and Gases. It is desired by the correlation of theoretical principles in the form of industrial plant problems to enlarge the viewpoint of the student and prepare him for Course 46-3.

MR. BAKER.

### 46-3 CHEMICAL ENGINEERING

*Curriculum: IV*

*Preparation: 46-2*

*Fourth year, both semesters*

*Three hours per week*

A continuation of the study of the principles underlying the mechanical operations involved in chemical industries, together with a study of the apparatus used to perform these operations. The subjects of crushing and grinding, separation, flow of heat, flow of fluids, evaporation, distillation, and drying, are considered in detail, accompanied by the solution of typical problems of a chemical engineering nature.

MR. BAKER.

### 47-1 INDUSTRIAL CHEMISTRY

*Curriculum: IV*

*Preparation: 44-1, 45-2*

*Fourth year, first semester  
second semester*

*Three hours per week  
Two hours per week*

The more important industrial processes are studied with a view to the general chemistry involved and to the various types of apparatus necessary to carry out the chemical reactions. The student is given a broad survey of the field of chemical industry and a knowledge of the relationships of the different industries to one another. The industries studied include the production of acids, alkali, fertilizers, glass, pigments, cements, soap, explosives, paper, petroleum, illuminating gas, and other general chemicals.

MR. BAKER.

## SCHOOL OF ENGINEERING

### 47-2 INDUSTRIAL CHEMISTRY LABORATORY

*Curriculum: IV*

*Preparation: 47-1,  
taken concurrently*

*Fourth year, both semesters*

*Four hours per week*

The quantitative study of the preparation and purification of a small number of chemical products, selected as types of reactions of industrial importance. The processes employed are carefully controlled, and the final products are analyzed to determine their purity. When the work is completed, a careful detailed report of each process is made and discussed in class.

MR. BAKER.

### 48-1 PHYSICAL CHEMISTRY

*Curriculum: IV*

*Preparation: 42-1, 43-1, 44-1*

*Fourth year, both semesters*

*Four hours per week*

The more important principles of Theoretical Chemistry are treated with great thoroughness and are illustrated by applying them to a large number of problems. During the course the following subjects are considered: derivation of molecular and atomic weights, derivation of formulae, properties of substances in the gaseous state, laws of solution, solutions of ionized substances, equilibrium of homogeneous systems, kinetics of reactions, phase rule diagrams, and thermochemistry.

MR. PERKINS.

## DEPARTMENT OF ADMINISTRATIVE ENGINEERING

### 50-1 INDUSTRIAL ORGANIZATION

*Curriculum: V*

*Preparation: — —*

*Third year, first semester*

*Two hours per week*

This course takes up the types of business organization, including the individual enterprise, the partnership, the corporation, the joint stock company, and the legal trust. A study is made of the advantages of combinations and the effect of legal regulations.

PROFESSOR BENEDICT.

## PROGRAM OF STUDIES

### 50-2 INDUSTRIAL FINANCE

*Curriculum: V*

*Preparation: 50-1*

*Third year, second semester*

*Two hours per week*

A continuation of Industrial Organization 50-1, with the addition of problems of promotion, underwriting, and general financing, common to all types of business.

PROFESSOR BENEDICT.

### 50-3 CORPORATIONS

*Curriculum: V*

*Preparation: 50-2*

*Third year, summer term*

*Five hours per week*

Several particular cases of large corporations are taken up from the financial standpoint of their success, or of their failure and reorganization.

### 50-4 BUSINESS MANAGEMENT

*Curriculum: V*

*Preparation: 50-2*

*Fourth year, first semester*

*Three hours per week*

The course consists of discussions and problems in physical arrangements of manufacturing plants and office management as related to production.

### 50-5 MARKETING

*Curriculum: V*

*Preparation: — —*

*Fourth year, first semester*

*Three hours per week*

This subject treats of market and trade channels, territorial divisions, the selection, training, and equipment of salesmen, advertising and publicity work, and other problems of selling the manufactured product.

### 50-6 BUSINESS ADMINISTRATION

*Curriculum: V*

*Preparation: 50-4*

*Fourth year, second semester*

*Three hours per week*

A study of the operation of manufacturing enterprises for profit. The details of the manufacturing departments, including time study and rate setting, together with related functions of employment, stores control, and shipping are taken up in detail.

## SCHOOL OF ENGINEERING

### 51-1 PRINCIPLES OF ACCOUNTING

*Curriculum: V*

*Preparation: — —*

*Third year, first semester*

*Three hours per week*

The intention is not to train the student to be a professional bookkeeper or auditor, but to promote an understanding of financial reports. Problems are given in double-entry book-keeping, debits and credits, balance sheets, and profit and loss statements.

MR. GOODRIDGE.

### 51-2 COST ACCOUNTING

*Curriculum: V*

*Preparation: 51-1*

*Third year, summer term*

*Ten hours per week*

The student is made familiar with the chief principles relating to the design of cost systems for manufacturing concerns, the distribution of overhead expense, and the various methods of following the cost of labor and materials on individual items of production.

### 52-1 BANKING AND SECURITIES

*Curriculum: V*

*Preparation: — —*

*Third year, second semester*

*Three hours per week*

Some of the topics considered are: national banks, trust companies, savings banks, clearing houses, loans, the money market, foreign exchange, securities, the construction of bond tables, sinking fund calculations, stock and produce exchanges.

MR. GOODRIDGE.

### 53-1 BUSINESS LAW

*Curriculum: V*

*Preparation: — —*

*Fourth year, second semester*

*Two hours per week*

The course consists of a general treatment of law and its application to business, considering in particular the laws governing contracts, agency and negotiable instruments.

# COURSES OF INSTRUCTION

No.	SUBJECT	Credit Hours	Curriculum	Year
010-1	English .....	50	All	1
011-1	German .....	20	IV	2
011-2	German .....	20	IV	3
012-1	History of Science .....	15	I, II, III, V	3
013-1	Government .....	20	All	3
014-1	Economics .....	20	All	3
020-1	College Algebra .....	30	All	1
021-1	Trigonometry .....	35	All	1
022-1	Analytic Geometry .....	40	All	1
023-1	Differential Calculus .....	35	All	2
023-2	Integral Calculus .....	35	All	2
030-1	Physics .....	10	All	1
031-1	Physics .....	35	All	1
032-1	Light .....	30	All	2
033-1	Heat .....	30	All	2
034-1	Physics Laboratory .....	10	All	1
034-2	Physics Laboratory .....	10	All	2
034-3	Physics Laboratory .....	10	All	2
041-1	Mechanical Drawing .....	25	All	1
041-2	Mechanical Drawing .....	20	I, IV	1
041-3	Mechanical Drawing .....	40	II, III, V	1
042-3	Machine Drawing .....	30	II, V	2
042-5	Engineering Drawing .....	40	I, III*, IV	3
043-1	Descriptive Geometry .....	30	I, II, III, V	1
044-2	Mechanism .....	25	II, V	2
044-3	Mechanism .....	55	II, V	2
050-1	Engineering Conference .....	60		2, 3, 4
052-1	Thesis .....	30	All	4
060-1	Physical Training .....	20	All	1
11-1	Surveying .....	35	I	1
11-2	Surveying .....	35	I	1
11-3	Surveying, Field and Practice .....	25	I	1
11-4	Surveying, Field and Practice .....	25	I	1
11-5	Surveying .....	30	I	2
11-6	Surveying, Field and Practice .....	25	I	2
11-7	Surveying .....	35	V	1
11-8	Topographical Drawing .....	15	I, V <sub>1</sub>	3
12-1	Railroad Surveying .....	30	I	2
12-2	Railroad Surveying, Field and Practice .....	25	I	2
12-3	Railroad Engineering .....	30	I	3
12-4	Railroad Engineering, Field and Practice .....	30	I	3
13-1	Hydraulics .....	30	I, II, V <sub>1</sub>	3
13-2	Hydraulic Motors .....	30	II, III*	3, 4*
13-3	Hydraulics .....	30	III, IV, V <sub>2</sub> *	3, 4*
14-1	Theory of Structures .....	40	I, V <sub>1</sub>	3
14-2	Structural Drawing .....	25	I, V <sub>1</sub>	3
14-3	Engineering Structures .....	65	I, V <sub>1</sub>	4
14-4	Structural Design .....	40	I, V <sub>1</sub>	4
15-1	Concrete .....	35	I, II	4
15-2	Concrete Design .....	25	I, II	4
16-1	Materials .....	20	I, II, V <sub>2</sub>	4
16-2	Testing Materials Laboratory .....	20	I, V <sub>1</sub>	3
16-3	Foundations .....	20	I	4
16-4	Geology .....	20	I, V <sub>1</sub>	3
17-1	Highway Engineering .....	20	I	4
21-1	Applied Mechanics .....	30	All	2
21-2	Applied Mechanics .....	30	All	2
21-3	Strength of Materials .....	70	I, II, V	3
21-4	Strength of Materials .....	35	III, IV	3
22-1	Graphical Analysis .....	45	II, V <sub>2</sub>	3
22-2	Machine Design .....	45	II, V <sub>2</sub>	3
22-3	Machine Design .....	80	II, V <sub>2</sub>	4
22-5	Mechanisms of Machines .....	30	II	3
23-1	Heat Engineering .....	60	II, III, V <sub>2</sub>	3
23-2	Engineering Laboratory .....	20	III	4

\* Curriculum and year as indicated.

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No.	SUBJECT	Credit Hours	Curriculum	Year
23-3	Heat Engineering .....	30	I, IV	3
23-4	Steam Turbines .....	15	II	3
23-5	Heat Engineering .....	30	II	4
23-6	Engineering Laboratory .....	20	II	3
24-1	Production Engineering .....	35	II, V	1
24-2	Production Engineering .....	35	II, V	1
24-3	Power Plant Equipment .....	35	II	3
24-4	Power Plant Engineering .....	35	II, V <sub>2</sub>	4
24-6	Standard Eng. Products and Processes .....	20	II, III	4
25-1	Industrial Plants .....	90	II, V <sub>2</sub>	4
30-1	Elements of Electricity .....	30	I, II, IV, V	2
30-3	Applied Electricity .....	30	I, II, IV, V	2
30-4	Applied Electricity Laboratory .....	40	I, II, IV, V	2
31-1	Elements of Electrical Engineering .....	30	III	1
32-1	Electrical Engineering I .....	40	III	1
32-3	Electrical Engineering II .....	90	III	2
32-4	Electrical Engineering II, Laboratory .....	80	III	2
32-6	Electrical Engineering III, Laboratory .....	60	III	3
32-7	Electrical Engineering III .....	90	III	3
32-8	Electrical Engineering IV, Laboratory .....	90	III	4
32-9	Electrical Engineering IV .....	90	III	4
33-1	Electrical Measurements .....	60	III	3
33-2	Electrical Measurements Laboratory .....	20	III	3
34-1	Electrical Engineering V .....	90	III	4
35-1	Advanced Electricity .....	30	III	4
40-1	Inorganic Chemistry .....	30	I*, II, III	1, 3*
41-1	Inorganic Chemistry .....	60	IV	1
41-2	Inorganic Chemistry Laboratory .....	40	IV	1
42-1	Qualitative Analysis .....	35	IV	1
42-2	Qualitative Analysis Laboratory .....	30	IV	1
43-1	Quantitative Analysis .....	40	IV	2
43-2	Quantitative Analysis Laboratory .....	50	IV	2
44-1	Technical Analysis .....	30	IV	3
44-2	Technical Analysis Laboratory .....	25	IV	3
44-3	Technical Analysis .....	30	IV	3
45-1	Organic Chemistry .....	70	IV	3
45-2	Organic Chemistry Laboratory .....	50	IV	3
45-3	Organic Chemistry .....	70	IV	4
45-4	Organic Chemistry Laboratory .....	60	IV	4
46-2	Chemical Engineering .....	30	IV	3
46-3	Chemical Engineering .....	70	IV	4
47-1	Industrial Chemistry .....	70	IV	4
47-2	Industrial Chemistry Laboratory .....	40	IV	4
48-1	Physical Chemistry .....	80	IV	4
50-1	Industrial Organization .....	25	V	3
50-2	Industrial Finance .....	25	V	3
50-3	Corporations .....	15	V	3
50-4	Business Management .....	50	V	4
50-5	Marketing .....	50	V	4
50-6	Business Administration .....	50	V	4
51-1	Principles of Accounting .....	35	V	3
51-2	Cost accounting .....	25	V	3
52-1	Banking and Securities .....	35	V	3
53-1	Business Law .....	35	V	4

\* Curriculum and year as indicated.

# THESES

## Class of 1921

- ABRAMSON, SAMUEL *Chemical Engineering*  
Revivification of Fuller's Earth by a Decolorization Method.
- ABROMSON, HARRY PHILIP (with O. Abromson) *Chemical Engineering*  
Design of a Plant for the Salem Gas Light Company for Producing Creosoting Oil.
- ABROMSON, ONNE (with H. P. Abromson) *Chemical Engineering*  
Design of a Plant for the Salem Gas Light Company for Producing Creosoting Oil.
- ALBERTS, SAMUEL (with C. E. Hills) *Electrical Engineering*  
Separation of Iron Losses in a Transformer.
- ATKINSON, RALPH *Chemical Engineering*  
Humidity Equilibrium of Common Substances.
- BROWN, MARTIN *Mechanical Engineering*  
The Arrangement of a Series of Engineering Laboratory Experiments for the Students of Northeastern College.
- CATES, LOUIS G. (with S. Levine) *Civil Engineering*  
Design of a Viaduct (Part of Plans of Boston Elevated Railway Extension, Dorchester, Mass.)
- CHENEY, NORMAN (with C. E. Mead) *Mechanical Engineering*  
Efficiency Tests of an Indian Motorcycle Engine.
- CLEMENTS, GEORGE (with R. Spear) *Civil Engineering*  
An Investigation of Dangerous Conditions Existing at Great Head, Winthrop, Mass., with Plans and Designs for the Solution of the Problem.
- COOPER, R. DUNHAM *Mechanical Engineering*  
A Study of the Power Plant of a Ship.
- CRAMER, GEORGE W. (with W. C. Richards) *Civil Engineering*  
Investigation of an Impounding Reservoir.
- CUNDARI, FRANK A. *Civil Engineering*  
Design of a Through Plate Girder Bridge on the Midland Division of the N. Y., N. H. and H. R. R. at Southampton Street, Boston.
- DOANE, KENDRICK P. (with H. M. Wilkins) *Civil Engineering*  
Reinforced Concrete Arch Highway Bridge for Proposed Road over Muddy River in the Back Bay Fens, Boston, Mass.
- FEARING, EDWARD W. (with F. H. LaBree) *Electrical Engineering*  
The Investigation of Electrical Grounds.
- GINDER, CHESTER J. *Civil Engineering*  
Design of Reinforced Concrete Garage to be Located Corner of Huntington Avenue and Greenleaf Streets, Boston.
- GORDON, MORRIS J. *Chemical Engineering*  
An Electrolytic Method of Determining Arsenic Quantitatively.
- HEAP, SHELDON I. *Electrical Engineering*  
An Investigation of a Counterpoise as used in Amateur Radio Telegraphy.
- HILLS, CHARLES E., JR. (with S. Alberts) *Electrical Engineering*  
Separation of Iron Losses in a Transformer.
- HOWE, MYRON A. (with G. F. Perry) *Civil Engineering*  
Design of Through Riveted Highway Bridge Over Sebethe River Between Towns of Middletown and Cromwell, Conn.
- KEITH, JAMES B. *Chemical Engineering*  
A Study of the Complex Amonic—Cobalt Salts and the Preparation of a Roseo—Cobaltic Chloride.

## SCHOOL OF ENGINEERING

- LABREE, FRANK H. (with E. W. Fearing) *Electrical Engineering*  
 The Investigation of Electrical Grounds.
- LANDRY, HERBERT A. (with V. R. Peterson) *Mechanical Engineering*  
 The Design of a 250-pound Household Refrigeration Unit.
- LATANZI, ALFRED *Civil Engineering*  
 Design of a Mill Building.
- LEVINE, SAMUEL (with L. G. Gates) *Civil Engineering*  
 Design of a Viaduct (Part of Plans of Boston Elevated Railway  
 Extension, Dorchester, Mass.
- MARSH, CHARLES C. *Electrical Engineering*  
 Distribution of Voltage Around the Commutator of a Given Machine.
- MEADE, CARL E. (with N. E. Cheney) *Mechanical Engineering*  
 Efficiency Tests of an Indian Motorcycle Engine.
- NICKERSON, CLARENCE W. *Mechanical Engineering*  
 Principles of Scientific Management, designed to increase the Efficiency of the Sanborn Company of Boston, Mass., Manufacturers of Scientific Instruments.
- PETERSON, VERNON R. (with H. A. Landry) *Mechanical Engineering*  
 The Design of a 250-pound Household Refrigeration Unit.
- PERRY, GILBERT F. (with M. A. Howe) *Civil Engineering*  
 Design of a Through Riveted Highway Bridge Over Sebethe River  
 Between Towns of Middletown and Cromwell, Conn.
- PHIPPS, CHESTER D. *Mechanical Engineering*  
 The Constant-Volume-During-Firing Internal Combustion Engine.
- PRIVES, HYMAN S. *Chemical Engineering*  
 The Determination of Ammonia, Pyridine, Pyrrole, and Quinoline  
 in Bone Oil.
- RICHARDS, WALTER C. (with G. W. Cramer) *Civil Engineering*  
 Investigation of an Impounding Reservoir.
- SANTIS, JULIUS C. *Chemical Engineering*  
 The Manufacture of White Lead by Electrolysis.
- SPEAR, ROGER (with G. Clements) *Civil Engineering*  
 An Investigation of Dangerous Conditions Existing at Great Head,  
 Winthrop, Mass., with Plans and Designs for the Solution of the  
 Problem.
- STANDLEY, DAVID (with M. Staples) *Civil Engineering*  
 Design of a Reinforced Concrete Coal Trestle.
- STAPLES, MERTON (with D. Standley) *Civil Engineering*  
 Design of a Reinforced Concrete Coal Trestle.
- SULLIVAN, JOHN J. *Electrical Engineering*  
 The Design of a Hydro Electric Power Plant.
- WERTH, LLOYD L. *Mechanical Engineering*  
 Design and Construction of a Toric Lens Polishing Machine.
- WILKINS, HENRY M. (with K. P. Doane) *Civil Engineering*  
 Reinforced Concrete Arch Highway Bridge for Proposed Road Over  
 Muddy River in the Back Bay Fens, Boston, Mass.

## REGISTER OF STUDENTS

### Enrolled During the School Year 1922-1923

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Abramovitz, Julius	C. E.	1925	Malden
Aimo, Karl H.	C. E.	1923	Allston
Ainsleigh, Charles W., Jr.	A. E.	1925	Atlantic
Alden, Edgar O.	E. E.	1925	East Saugus
Alderman, Leon D.	M. E.	1924	Beverly
Alexander, William T.	A. E.	1925	No. Harpswell, Me.
Allan, Charles R.	M. E.	1923	Pittsfield
Allan, William W.	C. E.	1924	Jamaica Plain
Allen, Earle C.	C. E.	1922	Holbrook
Almoin, Nerses A.	Ch. E.	1925	Newburyport
Alpers, Moses	Ch. E.	1925	Salem
Alves, John J.	M. E.	1922	Provincetown
Anderson, Arthur C.	M. E.	1925	Weymouth
Anderson, Carl R.	M. E.	1925	Orange
Anderson, E. Allen	Ch. E.	1924	Norwood
Anderson, Henry G.	M. E.	1924	West Roxbury
Anderson, Oscar W.	A. E.	1925	Hyde Park
Andrew, Phillip J.	E. E.	1925	Ayer
Anthony, Sidney S.	C. E.	1925	Manchester, N. H.
Arata, Claude J.	E. E.	1923	Hallowell, Me.
Ash, Clarence, D.	Ch. E.	1925	Somerville
Auld, Eugene G.	Ch. E.	1925	Everett
Ayer, Raymond B.	E. E.	1925	Plainville
Baader, Albert S.	E. E.	1924	Everett
Bacon, Robert E.	E. E.	1925	Nobscot
Bailey, Arthur H.	M. E.	1924	Brookfield
Bailey, Louis M.	E. E.	1923	South Duxbury
Bailey, Percy W.	E. E.	1922	Kingston
Baker, Charles G.	E. E.	1924	Georgetown
Baker, John M., Jr.	C. E.	1925	Swampscott
Baker, William F.	E. E.	1924	Charlestown
Baldi, Hugo A.	C. E.	1925	Everett
Ballou, George D.	C. E.	1922	Boston
Baratta, Edmund A.	C. E.	1925	Everett
Barber, Dana H.	M. E.	1924	Newton
Barker, Edward H.	E. E.	1925	East Bridgewater
Barnett, Stewart K.	C. E.	1925	East Douglas
Barney, Kenneth M.	E. E.	1924	Dorchester
Barrett, Roger N.	E. E.	1924	Marlboro
Barry, John J.	E. E.	1924	Salem
Barry, Thomas H.	A. E.	1925	Salem
Bartlett, Charles H.	C. E.	1925	Roslindale
Bartlett, James H., Jr.	C. E.	1924	Quincy
Bartlett, Lothrop B.	Ch. E.	1925	East Walpole
Barton, Kenneth L.	A. E.	1925	Meriden, N. H.
Baruffaldi, Lawrence	C. E.	1925	Somerville
Batchelder, Raymond	E. E.	1925	Manchester, N. H.
Bates, Charles Laurance	E. E.	1925	Whitman
Bates, Kimball S.	E. E.	1924	Huntington

# SCHOOL OF ENGINEERING

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Beard, Weldon N.	E. E.	1925	Melrose Highlands
Bearse, Allen H., Jr.	A. E.	1925	Melrose
Bearse, Richard C.	Ch. E.	1923	Springfield
Beattie, Robert	M. E.	1924	Everett
Becker, Abraham A.	Ch. E.	1923	Cambridge
Bell, Holton C.	M. E.	1925	Beverly
Bender, Albert V.	E. E.	1925	Dorchester
Benson, Gordon E.	E. E.	1925	Upton
Benson, Raymond H.	M. E.	1924	Athol
Berlyn, Lewis	E. E.	1923	Salem
Berman, Benjamin J.	Ch. E.	1925	Quincy
Berman, Harold A.	E. E.	1925	Roxbury
Berman, Isidor	Ch. E.	1925	Lexington
Berquist, John W.	Ch. E.	1925	Arlington
Berry, Earl R.	E. E.	1925	Worcester
Bertini, George E.	C. E.	1925	Everett
Besson, Ralph E.	M. E.	1923	Lynn
Bezanson, Irving E.	A. E.	1925	Milton
Bigelow, Cecil H.	M. E.	1923	Monument Beach
Bigelow, Maurice H.	Ch. E.	1924	Concord
Bikofsky, Isidor	A. E.	1925	Boston
Bingham, Lloyd A.	E. E.	1924	Middlebury, Vt.
Birch, William T. A.	E. E.	1925	Gray, Me.
Bissett, John E.	E. E.	1925	Quincy
Blair, Laurence C.	C. E.	1925	Petersham
Blake, Howard J.	Ch. E.	1924	Boston
Bliss, Theodore B.	Ch. E.	1923	Jamaica Plain
Blodgett, Newton K.	E. E.	1925	Canaan, Vt.
Bluemer, Edwin F.	A. E.	1924	Brookfield
Bodemer, Philip E.	C. E.	1924	Cambridge
Boden, Arthur T.	E. E.	1923	Beverly
Bonazzoli, August G.	Ch. E.	1925	Bolton
Boothroyd, Edwin	E. E.	1925	Fall River
Bouchard, George H.	Ch. E.	1924	Topsfield
Boyd, Ronald A.	E. E.	1924	Taunton
Boyd, Thomas P.	M. E.	1922	Chelsea
Bradbury, Rolfe C.	Ch. E.	1925	Cliftondale
Bradbury, Raymond J.	M. E.	1922	New Britain, Conn.
Bradford, Cecil B.	M. E.	1924	Plainfield, Conn.
Bradshaw, Alfred O.	C. E.	1924	Amesbury
Bradstreet, Raymond,	Ch. E.	1923	Middleton
Braica, Anthony A.	C. E.	1925	Springfield
Bramble, James L.	Ch. E.	1925	Pittsfield
Brask, Henry	C. E.	1923	Attleboro
Bray, Wesley R.	C. E.	1925	Torrington, Conn.
Breen, John J.	Ch. E.	1924	Rockport
Brennan, James F.	M. E.	1923	Salem
Bresson, Jules G.	C. E.	1925	Torrington, Conn.
Brewer, Arthur	M. E.	1924	Bar Harbor, Me.
Britchky, Hyman	Ch. E.	1922	Foxboro
Broadley, William A.	E. E.	1925	East Walpole
Brooks, Curtis C.	M. E.	1924	North Hanover
Brooks, Francis W.	M. E.	1922	Belmont

# REGISTER OF STUDENTS

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Brooks, John S.	M. E.	1924	North Hanover
Brown, Alfred	Ch. E.	1924	Everett
Brown, Bernard C.	C. E.	1924	Georgetown
Brown, Earl L.	C. E.	1925	Sanford, Me.
Brown, Gilbert M.	A. E.	1925	Amherst
Brown, James G.	M. E.	1924	Wakefield
Brown, Ralph E.	E. E.	1922	Rockland
Brown, Richard B.	E. E.	1922	Plymouth
Brown, Walter C.	E. E.	1925	Dorchester
Bruce, Alfred G.	E. E.	1925	Belfast, Me.
Bruce, Herbert A.	C. E.	1925	Watertown
Bryant, Everett H.	E. E.	1925	E. Templeton
Buck, Harold A.	C. E.	1925	Springfield
Bullard, Edmund H.	E. E.	1925	Medfield
Burbeck, Stanley O.	M. E.	1924	Woodsville, N. H.
Burke, George L.	C. E.	1924	Norwood
Burke, Walter F.	A. E.	1925	Dorchester
Burns, Rolfe W.	C. E.	1924	Erie, Pa.
Bushnell, Laverne	A. E.	1923	Dedham
Butterworth, Percy T.	E. E.	1923	Boston
Campbell, Malcolm K.	C. E.	1925	Somerville
Campbell, Oscar J.	M. E.	1924	Hudson, N. H.
Carl, James W.	M. E.	1922	Cambridge
Carlsen, Fred H.	E. E.	1922	Gloucester
Carroll, Frank J.	E. E.	1925	Taunton
Carroll, Francis R.	Ch. E.	1923	Cambridge
Carson, Forest A.	E. E.	1925	Waltham
Carswell, Atlee	A. E.	1925	Manchester
Caswell, Orville G.	M. E.	1923	East Lynn
Chandler, Henry W.	E. E.	1925	Nahant
Chapman, Allen E.	E. E.	1924	Stoneham
Chase, Charles S.	E. E.	1922	Leicester
Chase, Fred W., Jr.	C. E.	1924	Newburyport
Chauvey, Alfred A.	E. E.	1925	Norwood
Chilson, Warren A.	Ch. E.	1924	Milford
Chouinard, Louis	C. E.	1924	Thompsonville, Conn.
Christenson, Edward R.	C. E.	1925	Lee
Clark, Charles H.	M. E.	1925	Medfield
Clark, Raymond F.	E. E.	1925	North Abington
Clark, William M.	M. E.	1925	Hanover
Clarke, Harry J.	E. E.	1925	Wallingford, Conn.
Clarke, Kenneth O.	E. E.	1922	Kingston
Clarke, Robert H.	M. E.	1923	Melrose Highlands
Clarke, William R.	E. E.	1924	Wallingford, Conn.
Cleaves, Royden F.	M. E.	1924	Rochester, N. H.
Cleaves, Wynne P.	Ch. E.	1924	Waltham
Clement, John D., Jr.	E. E.	1925	Waltham
Clerke, Philip N.	E. E.	1925	Lynn
Cobb, Norman E.	M. E.	1925	Calais, Me.
Cobban, John D.	M. E.	1924	Groveland
Coburn, Wendell F.	Ch. E.	1924	Braintree
Coffin, Charles C.	M. E.	1924	Nantucket
Colbert, John A.	C. E.	1924	Somerville

# SCHOOL OF ENGINEERING

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Colburn, Hardy R.	M. E.	1924	<i>Boston</i>
Cole, Donald G.	E. E.	1925	<i>Windsor, Vt.</i>
Collins, Desmond M.	M. E.	1922	<i>Dorchester</i>
Colpitts, Aubrey K.	M. E.	1925	<i>Alma, N. B., Canada</i>
Comfort, Robert F.	A. E.	1925	<i>Winchester</i>
Connell, John H.	Ch. E.	1923	<i>Roxbury</i>
Connor, Wilbert H.	C. E.	1925	<i>Orient Heights</i>
Cook, Bernard L.	E. E.	1925	<i>Medford</i>
Cook, Hiram J.	M. E.	1923	<i>Franklin</i>
Cook, Harold S.	C. E.	1922	<i>Boston</i>
Cooke, Howard W.	E. E.	1922	<i>Athol</i>
Cooke, Joseph W.	E. E.	1925	<i>Goshen, Conn.</i>
Coombs, Seldon P.	M. E.	1922	<i>Medford</i>
Cooper, Charles S.	C. E.	1924	<i>Dorchester</i>
Cooper, George I.	Ch. E.	1924	<i>Dorchester</i>
Copeland, George R.	A. E.	1925	<i>Somerville</i>
Corliss, Theodore A.	A. E.	1925	<i>Somerville</i>
Corsano, Nicholas A.	A. E.	1925	<i>East Boston</i>
Courlang, Maurice	E. E.	1925	<i>Boston</i>
Cox, Allan N.	Ch. E.	1924	<i>Wellesley</i>
Crafts, Harold W.	E. E.	1924	<i>Ashfield</i>
Cragin, Donald G.	A. E.	1925	<i>Frammingham</i>
Cramb, Lester P.	E. E.	1925	<i>Melrose</i>
Crankshaw, Edwin	E. E.	1925	<i>Fall River</i>
Cressey, Dustin G.	E. E.	1922	<i>Malden</i>
Crockett, Elton G.	E. E.	1925	<i>Plainville</i>
Cross, Robert C.	M. E.	1925	<i>West Springfield</i>
Crossman, Hartwell H.	C. E.	1923	<i>Barrowsville</i>
Cruttenden, William B.	Ch. E.	1924	<i>Watertown, Conn.</i>
Cummings, John J.	C. E.	1923	<i>Roxbury</i>
Cummings, Roscoe L.	Ch. E.	1924	<i>Belmont</i>
Cundari, Joseph V.	C. E.	1924	<i>South Boston</i>
Cunningham, Linwood S.	C. E.	1924	<i>Burlington, Vt.</i>
Curra, Leonard A.	Ch. E.	1925	<i>Canton</i>
Curran, Francis M.	M. E.	1924	<i>Holyoke</i>
Cushing, Levi G.	E. E.	1923	<i>South Duxbury</i>
Cushing, Samuel	E. E.	1925	<i>Cambridge</i>
Cushing, Samuel A.	E. E.	1924	<i>Beverly</i>
Cutler, Wallace E.	E. E.	1925	<i>Franklin, N. H.</i>
Cutting, Clifford B.	M. E.	1925	<i>Melrose</i>
Damiani, Roland	C. E.	1924	<i>Beverly</i>
Damon, Donald B.	Ch. E.	1923	<i>Keene, N. H.</i>
Dane, Harry S.	Ch. E.	1925	<i>Roxbury</i>
Daniels, James W.	C. E.	1925	<i>Lupton, Mich.</i>
Davey, Frank H.	E. E.	1925	<i>New London, Conn.</i>
Davidson, Edward E.	M. E.	1925	<i>Everett</i>
Davidson, Edwin F.	Ch. E.	1925	<i>Atlantic</i>
Davis, Leon P.	C. E.	1923	<i>Kennebunk, Me.</i>
Davis, Robert F.	M. E.	1925	<i>Somerville</i>
Davis, Stuart S.	E. E.	1922	<i>Beverly</i>
Dawe, Allen S.	C. E.	1923	<i>Cambridge</i>
Day, George W.	E. E.	1925	<i>Boston</i>
Day, John L., Jr.	C. E.	1925	<i>Roslindale</i>

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NAME	DEPARTMENT	YEAR	HOME ADDRESS
Day, Wallace C.	C. E.	1925	<i>Springfield</i>
Dearborn, Elmore L.	C. E.	1922	<i>Hampton, N. H.</i>
DeMillia, Guy N.	E. E.	1925	<i>Cambridge</i>
Dickerman, Ralph T.	C. E.	1925	<i>Taunton</i>
Dickson, Franklin B.	E. E.	1925	<i>Milton, N. H.</i>
Dickson, Richard M.	A. E.	1924	<i>Holyoke</i>
Diggs, George L.	E. E.	1924	<i>Norwood</i>
D'Italia, Raymond	E. E.	1925	<i>Medford Hillside</i>
Dixon, Herbert C.	C. E.	1923	<i>Gloucester</i>
Doherty, Arthur H.	C. E.	1925	<i>Natick</i>
Dolan, Lawrence E.	E. E.	1925	<i>Middlebury, Vt.</i>
Donnelly, Robert L.	C. E.	1923	<i>Beverly</i>
Douglas, Alton L.	A. E.	1923	<i>East Hiram, Me.</i>
Downey, Ralph S.	M. E.	1922	<i>Hingham</i>
Drew, Edwin C.	E. E.	1925	<i>Marshfield Hills</i>
Driscoll, John J.	E. E.	1925	<i>Framingham</i>
Drislane, William F.	Ch. E.	1924	<i>Lynn</i>
Dunlap, William F.	C. E.	1925	<i>Plymouth</i>
Dunlevy, John J.	Ch. E.	1925	<i>Newton</i>
Dunn, James E.	Ch. E.	1925	<i>Salem</i>
Durgin, Harold L.	C. E.	1924	<i>Kittery, Me.</i>
Duston, Carmillus W.	M. E.	1923	<i>Framingham</i>
Dyer, Russell H.	C. E.	1925	<i>Dorchester</i>
Dyson, Charles A.	M. E.	1924	<i>Springfield</i>
Eastman, Harlow V.	E. E.	1924	<i>Ossipee, N. H.</i>
Eaton, Spencer E.	C. E.	1925	<i>Taunton</i>
Edgar, Robert C.	C. E.	1925	<i>Dorchester</i>
Eldridge, Gordon B.	Ch. E.	1924	<i>Concord</i>
Eldridge, Raymond	E. E.	1925	<i>Ashland</i>
Elliott, Frank R.	Ch. E.	1924	<i>Springfield</i>
Ellis, Lawrence B.	Ch. E.	1925	<i>Whitman</i>
Ellis, Russell F.	M. E.	1924	<i>Milldale, Conn.</i>
Ellms, Lindsay	E. E.	1923	<i>Cohasset</i>
Ely, Rodney, B.	C. E.	1924	<i>Centerbrook, Conn.</i>
Emery, Carl B.	C. E.	1924	<i>Portland, Me.</i>
Engstrand, Waldo	E. E.	1923	<i>Cranston, R. I.</i>
Engstrom, Howard T.	Ch. E.	1922	<i>Plymouth</i>
Erickson, Robert	M. E.	1925	<i>Fitchburg</i>
Ericson, Frederic O.	M. E.	1925	<i>Beverly</i>
Erskine, James S.	E. E.	1923	<i>Newburyport</i>
Everett, Albert E.	C. E.	1923	<i>Everett</i>
Ewell, Frederick A.	E. E.	1924	<i>Medford</i>
Fairbrother, Russell	Ch. E.	1925	<i>Bangor, Me.</i>
Faunce, Lawrence S.	M. E.	1922	<i>E. Rochester, N. H.</i>
Falt, Gordon H.	E. E.	1924	<i>Northeast Harbor, Me.</i>
Ferguson, Arthur W.	E. E.	1924	<i>Everett</i>
Ferguson, George F.	Ch. E.	1925	<i>E. Weymouth</i>
Fitzpatrick, Joseph B.	C. E.	1923	<i>Somerville</i>
Flanders, Henry R.	E. E.	1923	<i>Vineyard Haven</i>
Flood, Frank L.	C. E.	1922	<i>Framingham</i>
Flynn, Roland W.	A. E.	1925	<i>Concord Junction</i>
Foisie, George E.	C. E.	1923	<i>Nashua, N. H.</i>
Foley, Harold E.	E. E.	1925	<i>Everett</i>

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NAME	DEPARTMENT	YEAR	HOME ADDRESS
Ford, James B.	E. E.	1924	Melrose
Foster, Harry B.	E. E.	1924	Medford
Foster, Kenneth E.	M. E.	1925	Saugus
Fowler, Earl W.	E. E.	1925	Westfield
Fowler, William H.	C. E.	1922	Melrose
Fox, F. Sumner	E. E.	1922	Newburyport
Fraser, William A.	E. E.	1923	Jamaica Plain
Frazee, Walter E.	E. E.	1924	Medford
Frazier, Stuart D.	Ch. E.	1925	Hyde Park
Freedman, Max D.	Ch. E.	1925	Athol
Freeman, Isadore.	Ch. E.	1924	Winthrop
Freeman, James A.	C. E.	1924	Attleboro Falls
French, Benjamin H.	E. E.	1925	Boston
French, Murvin A.	E. E.	1925	Framingham
Friend, Omar W.	C. E.	1925	No. Anson, Me.
Frost, George	E. E.	1924	West Lynn
Frye, Harold B.	A. E.	1925	Roxbury
Frye, Richard F.	M. E.	1922	Athol
Fuller, John, Jr.	Ch. E.	1925	Quincy
Fundin, Hjalmar O. E.	M. E.	1923	Mattapan
Furrier, Joseph P.	C. E.	1923	Lynn
Gaffey, Francis J.	M. E.	1922	Salem
Gallagher, G. T.	C. E.	1925	Dorchester
Gallop, Myron E.	E. E.	1925	Ridgdonville, Me.
Gandreau, Louis E.	M. E.	1925	New London, Conn.
Gannett, Paul R.	E. E.	1925	Scituate
Gargaro, Alfred A.	C. E.	1923	West Quincy
Garney, Emery W.	C. E.	1924	Bridgewater
Garr, Isadore	A. E.	1925	Dorchester
Gaylord, Richard N.	E. E.	1925	Westfield
Gerber, Nathan	M. E.	1925	Roxbury
Gilbert, Merton L.	E. E.	1923	Cohasset
Gillis, Paul D.	C. E.	1925	Watertown
Gilman, Cecil E.	Ch. E.	1925	Madison, N. H.
Gilson, Thomas S.	A. E.	1925	Windsor, Vt.
Given, Sidney H.	C. E.	1925	W. Somerville
Gladding, Richard S.	Ch. E.	1922	Beverly
Gleason, Carl B.	Ch. E.	1923	Marblehead
Goddard, George W.	M. E.	1924	Somerville
Gold, Meyer	E. E.	1924	Avon, Conn.
Golden, Martin F.	C. E.	1925	Dorchester
Gordon, Phineas	C. E.	1923	Boston
Gould, Joseph E.	Ch. E.	1922	Roxbury
Goulet, Narcisse T.	Ch. E.	1922	Pawtucket, R. I.
Grady, James T.	E. E.	1925	South Boston
Graham, Elmer W.	E. E.	1925	Dorchester
Graham, Warren J.	M. E.	1924	Marlboro
Gray, Ernest W.	Ch. E.	1923	Scituate
Gray, Wilbur S.	E. E.	1925	Salem
Grenier, Francis	Ch. E.	1925	North Adams
Grigas, Jasper C.	A. E.	1925	Nashua, N. H.
Grover, J. Madison	Ch. E.	1925	Wellesley
Grozier, John W.	E. E.	1923	Foxboro

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NAME	DEPARTMENT	YEAR	HOME ADDRESS
Grushky, Maurice	C. E.	1924	<i>Beverly</i>
Gunther, Frederick E.	E. E.	1922	<i>Roslindale</i>
Hackett, James D.	E. E.	1925	<i>Watertown</i>
Haines, Joseph E.	M. E.	1924	<i>Boston</i>
Hale, Harold W.	C. E.	1922	<i>Swansea</i>
Hale, James E.	E. E.	1925	<i>Monson</i>
Hall, Chardon M.	M. E.	1925	<i>Winchendon</i>
Hall, Robert A.	E. E.	1924	<i>Brookline</i>
Hallam, Frank W.	E. E.	1925	<i>Winthrop</i>
Hamilton, Carroll L.	E. E.	1925	<i>Portland, Me.</i>
Hammond, Cleon C.	E. E.	1923	<i>Abington</i>
Hannable, Daniel W.	M. E.	1925	<i>Beverly Farms</i>
Harding, Arthur E.	C. E.	1922	<i>Boston</i>
Harlow, Elmer R.	C. E.	1924	<i>Plymouth</i>
Harrington, Elvin E.	A. E.	1925	<i>Milton</i>
Harrington, Frank C.	E. E.	1924	<i>So. Woodstock, Conn.</i>
Harris, George A. X.	M. E.	1925	<i>Cambridge</i>
Harris, Henry S.	Ch. E.	1925	<i>Allston</i>
Harvey, Ralph H.	E. E.	1925	<i>South Berwick, Me.</i>
Haskell, J. Reginald	M. E.	1924	<i>Webster</i>
Haskins, Elmer E.	M. E.	1925	<i>Dighton</i>
Haskins, Howard L.	M. E.	1924	<i>Wollaston</i>
Hatch, Douglas P.	M. E.	1923	<i>Lynn</i>
Hathaway, Chauncey E.	Ch. E.	1922	<i>Dorchester</i>
Havlicek, Joseph A.	C. E.	1925	<i>Middletown, Conn.</i>
Hawks, Robert A.	E. E.	1924	<i>Newton Centre</i>
Heald, Theodore B.	A. E.	1925	<i>Amherst</i>
Hearty, Herbert W., Jr.	A. E.	1925	<i>Dorchester</i>
Hedlund, Charles F.	E. E.	1925	<i>Braintree</i>
Heinlein, Martin L.	E. E.	1923	<i>South Natick</i>
Henry, Bernard D.	C. E.	1925	<i>Melrose</i>
Herlihy, John A.	C. E.	1925	<i>Wilton, N. H.</i>
Herrick, Benjamin H.	C. E.	1924	<i>Wollaston</i>
Hiatt, Frank C.	E. E.	1923	<i>Malden</i>
Hill, George B.	Ch. E.	1923	<i>Berlin, N. H.</i>
Hiltz, Walter M.	E. E.	1925	<i>Everett</i>
Hinckley, Herbert P.	M. E.	1925	<i>Manaroneck, N. Y.</i>
Hjelmberg, Arthur G.	M. E.	1923	<i>Boston</i>
Hoffman, Harry J.	E. E.	1924	<i>Jamaica Plain</i>
Holland, Carl T.	E. E.	1922	<i>Nantasket</i>
Hollis, Howard W.	E. E.	1925	<i>Wareham</i>
Holmes, Ashton B.	E. E.	1925	<i>Charlestown, N. H.</i>
Holthaus, Frederick J.	E. E.	1922	<i>Winthrop</i>
Hopkins, Forrest R.	M. E.	1923	<i>Newport, N. H.</i>
Hopkins, Howe H.	M. E.	1925	<i>Trenton, Me.</i>
Houghton, Norman R.	E. E.	1925	<i>Stoneham</i>
Hovenanian, Hovenan	Ch. E.	1925	<i>Cambridge</i>
Howard, John M.	E. E.	1924	<i>Providence, R. I.</i>
Hubbard, Howard M.	A. E.	1924	<i>Springfield</i>
Hubby, Leon F.	E. E.	1924	<i>Lee</i>
Hulsman, David L.	Ch. E.	1922	<i>Everett</i>
Hulsman, Kenneth G.	C. E.	1924	<i>Everett</i>
Huntington, Clarence M.	M. E.	1923	<i>Cambridge</i>

# SCHOOL OF ENGINEERING

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Ireland, Theodore S.	M. E.	1922	Gloucester
Ives, Walton S.	Ch. E.	1925	Winthrop
Jacobson, Howard	E. E.	1924	Concord
Jackson, John S.	Ch. E.	1925	Lewiston, Me.
Jaffe, Meyer R.	C. E.	1925	North Adams
Janes, George N.	E. E.	1925	Cheslea
Jenks, Donald G.	E. E.	1924	Attleboro
Jennings, Lawrence W.	A. E.	1923	Winthrop
Johnson, Donald	E. E.	1925	Waltham
Johnson, Evan	E. E.	1925	Norwood
Johnson, Henry D.	C. E.	1924	Auburn, Me.
Johnson, John E.	Ch. E.	1925	Maynard
Johnson, Joseph E.	A. E.	1923	Roxbury
Johnson, Theodore A.	C. E.	1925	Marlboro
Johnson, Walter A.	M. E.	1924	Dorchester
Jones, Archibald L.	E. E.	1923	Middleton
Jones, Henry C., Jr.	A. E.	1925	Lowell
Jones, Harold H.	C. E.	1923	Swampscott
Josephson, Harold C. W.	E. E.	1925	Somerville
Junior, Francis E.	C. E.	1922	Plymouth
Katzeff, Julius	Ch. E.	1925	Winthrop
Keene, Burton F.	E. E.	1923	South Hanson
Kelleher, James J.	M. E.	1922	Salem
Kelley, Charles E.	E. E.	1925	Norwood
Kelley, Harold W.	C. E.	1924	Dorchester
Kelley, Thomas G.	M. E.	1922	Roslindale
Kendrew, Albert E.	C. E.	1924	Roxbury
Kennedy, Parker R.	C. E.	1925	Mattapan
Kenney, David J.	C. E.	1923	Boston
Kenney, Francis B.	C. E.	1924	Manchester, N. H.
Kenney, John H.	A. E.	1923	Boston
Kershner, Walter L.	E. E.	1925	Strong, Me.
Keville, Leo A.	C. E.	1925	Lowell
Kimball, Carleton B.	E. E.	1925	Salisbury
Kimball, Donald S.	A. E.	1925	Bridgewater
King, Arthur M.	C. E.	1925	Medway
King, Earle	C. E.	1925	Pottersville
King, William H.	E. E.	1924	Everett
Klein, Morris	E. E.	1925	Windsor, Vt.
Knight, Robert H.	E. E.	1925	Newbury
Knight, Vernon H.	E. E.	1924	Brockton
Knopp, Otto R. H.	E. E.	1923	E. Taunton
Knudson, Carroll B.	E. E.	1925	Boston
Knuepfer, Charles F.	M. E.	1923	Boston
Kosak, Nathaniel	Ch. E.	1924	Everett
Krohn, Bertil W.	E. E.	1925	W. Hartford, Conn.
Kumpel, Edgar W.	C. E.	1924	Everett
LaMarche, Logan	C. E.	1924	Cambridge
Lamarine, Alfred E.	E. E.	1924	Natick
Lancaster, Elon F.	E. E.	1923	Madison, Me.
Landry, Ernest L.	E. E.	1925	Thompsonville, Conn.
Landy, George	E. E.	1925	Boston
Lane, Charles M., Jr.	E. E.	1924	Hartford, Conn.

# REGISTER OF STUDENTS

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Langstroth, Guy N.	C. E.	1924	<i>Boston</i>
Langtry, Chester F.	C. E.	1925	<i>Framingham</i>
Larson, C. William	M. E.	1923	<i>Worcester</i>
Lassof, Israel	Ch. E.	1924	<i>Lexington</i>
Latimer, William	A. E.	1924	<i>Leominster</i>
Laubenstein, Karl G.	Ch. E.	1924	<i>Maynard</i>
Lauretzen, Walter M.	Ch. E.	1924	<i>Mattapan</i>
Law, William H.	C. E.	1924	<i>Rockport</i>
Lawler, John D.	Ch. E.	1923	<i>Lowell</i>
Lawton, Robert C.	M. E.	1925	<i>Orwell, Vt.</i>
Leach, Donald F.	M. E.	1925	<i>Whitman</i>
Leacy, Eugene S.	M. E.	1925	<i>Watertown</i>
Leavitt, Curtis G.	C. E.	1924	<i>Taunton</i>
Leavitt, Howard L.	E. E.	1924	<i>Roxbury</i>
Lee, Alfred	E. E.	1924	<i>Lawrence</i>
Lee, I. Albert	E. E.	1922	<i>Salem</i>
Lee, Walter H.	C. E.	1922	<i>Dorchester</i>
Leggett, David J.	Ch. E.	1925	<i>Assinippi</i>
Lent, Stanley B.	Ch. E.	1925	<i>Dorchester</i>
Lessard, Theodore T.	C. E.	1925	<i>Springfield</i>
Letourneau, Roland F.	Ch. E.	1923	<i>Rockland</i>
Levin, Eli	Ch. E.	1923	<i>Roxbury</i>
Levine, Maurice	C. E.	1925	<i>Fall River</i>
Levy, Hyman	E. E.	1923	<i>Boston</i>
Lewis, Clarence W.	E. E.	1924	<i>Beverly</i>
Lewis, Ervin H.	E. E.	1923	<i>Newtonville</i>
Lewis, John B.	C. E.	1925	<i>Arlington Hts.</i>
L'Heureux, Joseph A.	C. E.	1925	<i>Lowell</i>
Libby, Channing	C. E.	1925	<i>East Weymouth</i>
Lindsay, Edward A.	M. E.	1924	<i>Wollaston</i>
Linskog, Sidney W.	E. E.	1924	<i>Brockton</i>
Linell, Elmer G.	E. E.	1925	<i>Gardner</i>
Locash, Salvatore	C. E.	1925	<i>Wakefield</i>
Lockhart, Ralph C.	M. E.	1925	<i>Greenfield</i>
Locke, Roger P.	A. E.	1925	<i>Salem</i>
Lord, Forrest M.	E. E.	1925	<i>Sharon</i>
Loubris, Gaston E.	E. E.	1923	<i>Wakefield</i>
Lovejoy, Richard P.	Ch. E.	1922	<i>Franklin</i>
Low, Elmer F.	C. E.	1924	<i>Woodsford, Me.</i>
Lucas, Ernest H.	Ch. E.	1924	<i>Magnolia</i>
Lucy, Herbert S.	E. E.	1925	<i>Groton</i>
Luippold, John J.	M. E.	1925	<i>W. Roxbury</i>
Lundin, Erik H.	E. E.	1923	<i>Proctor, Vt.</i>
Lynch, Thomas J.	M. E.	1925	<i>Dorchester</i>
Mabey, Melvin	A. E.	1925	<i>Newton</i>
Macaulay, James E.	C. E.	1925	<i>Medford</i>
MacConnell, Norman J.	E. E.	1925	<i>Medford</i>
MacDonald, James V.	M. E.	1925	<i>Peabody</i>
MacDonald, Robert M. T.	M. E.	1924	<i>W. Roxbury</i>
MacKay, Chauncey D.	A. E.	1925	<i>Dorchester</i>
MacKinnon, Weber J.	E. E.	1925	<i>Meriden, Conn.</i>
MacLeod, Edward M.	E. E.	1925	<i>E. Dedham</i>
Macomber, Charles W.	E. E.	1925	<i>Marshfield Hills</i>

# SCHOOL OF ENGINEERING

NAME	DEPARTMENT	YEAR	HOME ADDRESS
McBride, Lloyd L.	E. E.	1925	Lubec, Me.
McCarthy, Louis B.	C. E.	1925	Newton
McCarthy, Robert E.	E. E.	1925	Natick
McCue, Edward L.	E. E.	1925	Roxbury
McElhinney, Earle S.	M. E.	1924	Lynn
McKenne, Charles D.	M. E.	1923	Everett
McKewen, George D.	Ch. E.	1924	Eastport, Me.
McManus, John P.	C. E.	1923	Roxbury
McNabo, Anthony H.	C. E.	1925	Bradford
McQuillan, Arthur J.	E. E.	1925	Dorchester
McSweeney, William H.	M. E.	1924	Salem
Mahoney, John H.	E. E.	1924	Salem
Mailhot, Willrod A.	E. E.	1925	Somersworth, N. H.
Malloch, Ernest M.	C. E.	1925	Eastport, Me.
Mallore, Walter B.	E. E.	1925	Lynn
Malloy, John W.	M. E.	1924	Roxbury
Malm, Herbert A.	A. E.	1924	Worcester
Malnate, William F.	C. E.	1924	Quincy
Maloney, Edward F.	Ch. E.	1922	Dorchester
Mann, J. Ralph	Ch. E.	1925	Dorchester
Marcoux, Ernest A.	Ch. E.	1925	Watertown
Marcus, Jacob	Ch. E.	1922	Winthrop
Marcus, Maurice	C. E.	1922	Dorchester
Margeson, Vertrude C.	E. E.	1925	Everett
Marsh, Edwin E. R.	E. E.	1925	Pittsfield
Marshall, Elmer P.	Ch. E.	1924	Allston
Marshall, James P.	E. E.	1923	Hallowell, Me.
Martin, Arthur D.	C. E.	1925	Richford, Vt.
Martin, B. Malcolm	M. E.	1924	Swampscott
Martin, Herbert S.	Ch. E.	1925	Somerville
Martinelli, Henry C.	M. E.	1924	Springfield
Mason, Charles F.	E. E.	1924	Pownal, Vt.
Maurette, Rene G.	E. E.	1925	Medford
Maxwell, George W.	E. E.	1925	Melrose
Maxwell, Sherman O.	A. E.	1925	Somerville
May, Charles A.	C. E.	1924	Fairhaven, Vt.
Meade, William H., Jr.	E. E.	1923	Peabody
Meagher, John J.	C. E.	1922	E. Chelmsford
Merrill, Louis F.	A. E.	1925	Wollaston
Meserve, George H., Jr.	C. E.	1925	Medford
Messier, Joseph A.	E. E.	1924	Quincy
Miller, Merton W.	Ch. E.	1925	Waltham
Milne, David C.	C. E.	1923	Hackensack, N. J.
Mitchell, I. Earle	E. E.	1925	Wallingford, Conn.
Molliver, Henry	E. E.	1925	Chelsea
Moody, Donald C.	M. E.	1923	Bradford
Moore, Charles K.	C. E.	1924	Fall River
Morgan, Frederick N.	Ch. E.	1924	Everett
Morgan, Harold E.	A. E.	1925	Lawrence
Morgan, Merrill R.	E. E.	1925	Lubec, Me.
Morgan, Stuart H.	Ch. E.	1922	Medford
Morrell, Stanley	E. E.	1923	Peabody
Morris, Joseph A.	E. E.	1924	New Britain, Conn.

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NAME	DEPARTMENT	YEAR	HOME ADDRESS
Morse, Howard W.	E. E.	1925	Lynn
Mower, C. Thomas	Ch. E.	1924	Malden
Murphy, Charles L.	C. E.	1924	Worcester
Murphy, Nelson L.	C. E.	1925	Waltham
Navisky, Moses	Ch. E.	1925	Boston
Nelson, Carl H.	A. E.	1925	Dorchester
Nelson, Edwin W.	A. E.	1925	Hartford, Conn.
Newman, Harry	Ch. E.	1925	Salem
Newman, Irving M.	E. E.	1924	Boston
Newton, Elmer C.	E. E.	1925	Raymond, N. H.
Niechcay, Frank K.	C. E.	1925	Jamaica Plain
Nivinski, Alexander A.	C. E.	1925	Hyde Park
Noble, Robert A.	E. E.	1923	Rochester, Vt.
Nolf, Ralph L.	E. E.	1925	Webster
Norberg, Ernest M.	C. E.	1922	Medford
Norton, George R.	M. E.	1925	Avon, Me.
Noyes, Roswell L.	M. E.	1925	Newburyport
Nylin, Carl G.	M. E.	1922	Worcester
Nyman, Chester L.	C. E.	1922	Marlboro
Oakman, Roger G.	C. E.	1924	Neponset
O'Connell, Harold J.	E. E.	1925	Dorchester
Ogden, Milton P.	E. E.	1925	Fall River
Oliva, John F.	E. E.	1924	E. Weymouth
Olson, Roy C.	M. E.	1925	Squantum
O'Roak, Ralph D.	M. E.	1925	Pittsfield, Me.
O'Sullivan, Cornelius R.	E. E.	1925	Lawrence
Overbeck, Royal C.	Ch. E.	1924	Gloucester
Oxley, John J.	Ch. E.	1925	Pawtucket, R. I.
Oxnard, Edward P.	Ch. E.	1925	West Medford
Paige, Herman A.	A. E.	1925	Dorchester
Palmer, Reginald W.	C. E.	1925	Norfolk Downs
Parad, Emanuel	M. E.	1922	Boston
Parker, Albert I.	M. E.	1925	Melrose
Parker, Burton C.	C. E.	1925	Holden
Parker, Horace R., Jr.	E. E.	1925	Swampscott
Parmenter, Richard	C. E.	1925	Ashland
Parson, Alfred D.	C. E.	1922	Melrose
Parsons, Edward S.	C. E.	1922	Gloucester
Parsons, William N.	C. E.	1924	Gloucester
Pascoe, Thomas E.	M. E.	1922	Chocorua, N. H.
Paulsen, Iver E.	Ch. E.	1923	Woburn
Paver, William H.	M. E.	1922	Franklin
Pearce, Howard T.	C. E.	1922	Concord Junction
Pearson, Carl R.	C. E.	1922	Wintthrop
Peck, Donald L.	E. E.	1923	Framingham
Penniman, John R.	C. E.	1924	Whitman
Perkins, Eustace J.	E. E.	1925	Wenham
Perley, George T.	E. E.	1924	Wollaston
Perry, Alfred L.	M. E.	1924	Everett
Perry, Edward J.	M. E.	1923	Putnam, Conn.
Perry, Lyndall R.	Ch. E.	1925	Medford
Peterson, Andrew M.	Ch. E.	1925	South Boston
Peterson, Arthur W.	E. E.	1925	Wellesley

## SCHOOL OF ENGINEERING

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Peterson, Clarence W.	M. E.	1923	Everett
Peterson, Douglas A.	E. E.	1925	Brighton
Peterson, Halvar A.	E. E.	1925	Waltham
Philbrick, Albert W.	E. E.	1924	Kittery, Me.
Phillips, Howard A.	E. E.	1925	Petersham
Phinney, Edward D.	E. E.	1924	Topsham, Me.
Pierce, Melvin G.	E. E.	1925	Arlington
Pierce, Webster W.	M. E.	1923	Quincy
Pinkul, Edward J.	C. E.	1924	Dorchester
Pitman, George M.	C. E.	1925	Salem
Plante, Elphage E.	E. E.	1925	Manchaug
Platt, Charles E.	E. E.	1925	Medford Hillside
Plaus, Harley O.	M. E.	1925	Worthington
Plunkett, Robert K.	M. E.	1924	Dorchester
Proctor, Lloyd V.	E. E.	1925	So. Weymouth
Prophet, Alta A.	C. E.	1925	Clinton
Poley, Abraham	A. E.	1925	Boston
Powell, John R.	M. E.	1925	Waverly
Powers, Everett A.	Ch. E.	1925	Gloucester
Powers, Fern L. B.	E. E.	1925	Laconia, N. H.
Publicover, Lewis E.	E. E.	1924	Gloucester
Putnam, Charles H.	M. E.	1924	Webster
Quilty, Ralph G.	Ch. E.	1924	Dorchester
Quinn, John F.	E. E.	1923	Salem
Rabinowitz, Louis	E. E.	1924	Roxbury
Ravden, Sydney	Ch. E.	1925	Dorchester
Ravreby, Abraham A.	Ch. E.	1925	Boston
Read, Alden W.	E. E.	1924	Bridgewater
Read, Herbert C.	Ch. E.	1925	Springfield
Reed, Kenneth D.	A. E.	1925	Winthrop
Reed, Linwood L.	M. E.	1923	Everett
Reed, Miller G.	E. E.	1924	Boothbay Harbor, Me.
Reed, Robert F.	E. E.	1923	Granville Ferry, N. S.
Reilly, Rupert M.	M. E.	1925	Bristol, Me.
Reuther, Willard E.	E. E.	1925	Jefferson
Rhoades, Clifford T.	C. E.	1922	Bridgewater
Riccio, Angelo P.	M. E.	1925	Watertown
Rich, Luke A.	Ch. E.	1923	Newton
Rich, Roy D.	A. E.	1925	Athol
Richard, Irene T.	M. E.	1924	Salem
Richards, Charles N.	C. E.	1925	Milton
Rideout, Edward H.	Ch. E.	1925	West Somerville
Riggio, Samuel A.	C. E.	1924	Ivoryton, Conn.
Ripley, Franklin L.	Ch. E.	1925	W. Stewartstown, N. H.
Roach, Harold N.	A. E.	1925	N. Gloucester, Me.
Robbins, Bertrand B.	E. E.	1922	Elmwood
Roberts, Frank	Ch. E.	1925	Everett
Roberts, George I.	E. E.	1924	E. Weymouth
Roberts, Ulysses K.	E. E.	1925	Berwick, Me.
Robinson, William J.	Ch. E.	1923	Pawtucket, R. I.
Roby, Wilbur	E. E.	1925	Arlington
Rogers, Allan H.	E. E.	1924	Jonesport, Me.
Rommer, George J.	A. E.	1925	Dorchester

# REGISTER OF STUDENTS

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Rood, Clarence B.	C. E.	1925	<i>West Medford</i>
Root, Burritt A.	M. E.	1923	<i>New Britain, Conn.</i>
Rosen, Philip	Ch. E.	1922	<i>Boston</i>
Rosenblatt, Irving I.	C. E.	1922	<i>Saxonville</i>
Rubin, Benjamin	C. E.	1923	<i>Roxbury</i>
Rubin, Morris	C. E.	1925	<i>Roxbury</i>
Rundlett, John C.	C. E.	1924	<i>Newburyport</i>
Russell, Charles C.	E. E.	1923	<i>Exeter, N. H.</i>
Russell, John B.	C. E.	1924	<i>Quincy</i>
Sampson, Edward N.	E. E.	1922	<i>Quincy</i>
Sanborn, Frank D.	M. E.	1924	<i>Springfield, Vt.</i>
Sanborn, George H.	M. E.	1924	<i>Springfield, Vt.</i>
Sanderson, Albert E.	C. E.	1925	<i>Waltham</i>
Savignac, Alphonse L.	C. E.	1923	<i>Amesbury</i>
Savikoski, George V.	Ch. E.	1925	<i>Maynard</i>
Sawtell, Raymond I.	E. E.	1924	<i>Shrewsbury</i>
Sawyer, Russell D.	M. E.	1925	<i>Concord</i>
Schaller, Irving R.	E. E.	1924	<i>Salem</i>
Schneider, Arthur E.	Ch. E.	1925	<i>Meriden, Conn.</i>
Schofield, Clifford L.	Ch. E.	1925	<i>Maynard</i>
Schwartz, Joseph P.	C. E.	1923	<i>Revere</i>
Seaman, Walter R.	A. E.	1925	<i>Roxbury</i>
Secord, Harold W. M.	E. E.	1923	<i>Newton</i>
Semenyna, Waldimir	C. E.	1924	<i>Boston</i>
Shailer, Fisk A.	M. E.	1924	<i>Chester, Conn.</i>
Shapiro, David	C. E.	1925	<i>Fall River</i>
Sharples, Oswald	E. E.	1925	<i>Waltham</i>
Shaw, J. Arnold	Ch. E.	1924	<i>Danvers</i>
Shaw, Richard C.	M. E.	1923	<i>E. Bridgewater</i>
Shea, Albert L.	A. E.	1925	<i>Rumford, Me.</i>
Shenk, Norman A.	C. E.	1925	<i>Medford</i>
Shepard, Chester D.	A. E.	1925	<i>Everett</i>
Shields, Francis R.	E. E.	1925	<i>Malden</i>
Shopneck, Henry P.	Ch. E.	1922	<i>Boston</i>
Short, B. James	E. E.	1925	<i>Boston</i>
Short, Randolph	E. E.	1925	<i>Newburyport</i>
Shumavonian, Sorun P.	C. E.	1924	<i>Dorchester</i>
Shumway, Herbert L.	M. E.	1923	<i>Mattapan</i>
Sibley, Clifton A.	A. E.	1925	<i>Salem</i>
Silverman, Morris	M. E.	1924	<i>Quincy</i>
Siselsky, Morris	E. E.	1925	<i>Boston</i>
Sisson, Rollo H.	E. E.	1925	<i>E. Providence</i>
Slobin, Harold M.	C. E.	1925	<i>Worcester</i>
Small, Howard H.	A. E.	1925	<i>New Gloucester, Me.</i>
Smethurst, Raymond	C. E.	1925	<i>Hopedale</i>
Smiley, Kenneth	Ch. E.	1925	<i>Skowhegan, Me.</i>
Smith, Benjamin L.	E. E.	1923	<i>Concord</i>
Smith, Farnham W.	Ch. E.	1923	<i>Concord</i>
Smith, Robert B.	A. E.	1924	<i>Leominster</i>
Smith, Thomas J.	E. E.	1925	<i>Medford</i>
Somes, John J.	M. E.	1924	<i>Gloucester</i>
Sondberg, Thomas	Ch. E.	1925	<i>York Village, Me.</i>
Souther, George H.	M. E.	1924	<i>Winthrop</i>

# SCHOOL OF ENGINEERING

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Southworth, Burton	E. E.	1924	W. Stoughton
Soutter, Earle H.	E. E.	1925	Charlestown
Spaulding, Harold L.	E. E.	1925	Sharon
Spaulding, Howard P.	A. E.	1925	W. Stoughton
Spear, Chester M.	M. E.	1925	Brockton
Sperl, Warren	Ch. E.	1922	Auburndale
Spiegel, Maurice	Ch. E.	1925	Malden
Spofford, Frank J.	E. E.	1925	Haverhill
Stanetsky, Louis	Ch. E.	1925	Everett
Stanton, Fred P., Jr.	E. E.	1924	Wenham
Staples, Arthur C.	E. E.	1924	Segreganset
Stearns, Elton O.	C. E.	1924	Waltham
Steere, Harry W.	E. E.	1925	Amesbury
Stenquist, Edward H.	M. E.	1924	Worcester
Stephenson, William G.	C. E.	1925	Needham
Stern, Frederick P.	C. E.	1925	Somerville
Stevens, Charles N.	E. E.	1925	Mattapan
Stevens, Thomas A.	E. E.	1923	Deep River, Conn.
Stimson, Glen H.	M. E.	1924	Athol
Stockwell, Phillip J.	E. E.	1925	Reading
Story, Clinton R.	A. E.	1925	Salem
Stotz, Herman C.	C. E.	1924	Brighton
Stratton, Aubrey E.	C. E.	1925	W. Townsend, Vt.
Strong, John S.	M. E.	1924	Winthrop
Studler, Morris	C. E.	1925	Boston
Sullivan, George E.	E. E.	1925	Beverly
Sullivan, John J.	E. E.	1922	Holyoke
Sullivan, William H.	M. E.	1922	Salem
Swanson, Gustaf	Ch. E.	1923	Proctor, Vt.
Swanson, Wallace C.	M. E.	1924	Lynn
Swasey, Richard L.	E. E.	1925	Waterbury, Vt.
Sweetland, William F., Jr.	E. E.	1924	Providence, R. I.
Swetzoff, Benjamin N.	E. E.	1925	Roxbury
Swift, Ralph E.	M. E.	1925	Longmeadow
Tarplin, Emanuel	Ch. E.	1923	Lynn
Taylor, A. Pirrie	M. E.	1924	Dorchester
Taylor, Leslie I.	C. E.	1925	Hartford, Conn.
Taylor, Robert N.	Ch. E.	1924	Watertown
Tebbetts, Eugene L.	Ch. E.	1925	Holliston
Tellier, Chester L.	Ch. E.	1925	Braintree
Therault, Joseph E.	C. E.	1925	Newton
Thomas, Raymond I.	E. E.	1925	Milford
Thompson, Alan M.	C. E.	1923	Roslindale
Thompson, George B. S.	E. E.	1925	Willimantic, Conn.
Thompson, George M.	E. E.	1925	Norwood
Thompson, Harold C.	C. E.	1923	Bridgewater
Thompson, Herbert L.	Ch. E.	1923	Norwood
Thomson, Claude W. R.	M. E.	1924	Holyoke
Thomson, Earl H.	M. E.	1925	Boston
Thurston, George T.	A. E.	1925	Fall River
Tibbetts, Roger M.	E. E.	1925	Newcastle, Me.
Tisdale, Donald C.	E. E.	1925	Norwell
Titcomb, Oliver S.	M. E.	1924	Somerville

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NAME	DEPARTMENT	YEAR	HOME ADDRESS
Toas, Norman H.	Ch. E.	1925	<i>Boston</i>
Todd, Floyd E.	M. E.	1925	<i>York, Me.</i>
Toole, Cameron S.	C. E.	1922	<i>Clinton</i>
Toole, Harold J.	A. E.	1925	<i>Clinton</i>
Topalian, Asadore	E. E.	1923	<i>Brighton</i>
Topalian, Stephen P.	C. E.	1925	<i>Boston</i>
Torrey, Joseph H.	M. E.	1925	<i>Bath, Me.</i>
Travis, Robert E.	M. E.	1922	<i>Framingham</i>
Tucker, Nathan	C. E.	1925	<i>Dorchester</i>
Tucker, Newton E.	Ch. E.	1925	<i>New Britain, Conn.</i>
Tukey, Egbert O.	—	1925	<i>Pemaquid, Me.</i>
Tulloch, Douglas F.	E. E.	1924	<i>Bridgewater</i>
Turner, Burton G.	C. E.	1922	<i>Eastport, Me.</i>
Ulmer, Donald J.	E. E.	1924	<i>Norton</i>
Urquhart, James W.	C. E.	1925	<i>Waltham</i>
Vandenkerckhoven, William	E. E.	1924	<i>Bethel, Me.</i>
Veale, Louis V.	A. E.	1925	<i>Barre, Vt.</i>
Vigdor, Irving A.	E. E.	1924	<i>Dorchester</i>
Vincent, George D.	C. E.	1924	<i>Watertown</i>
Vines, Frederick D. L.	E. E.	1924	<i>Greenbush</i>
Visnick, Alexander	A. E.	1925	<i>Mattapan</i>
Vodoklys, Frank V.	Ch. E.	1925	<i>Maynard</i>
Wade, Edward A.	E. E.	1924	<i>Jamaica Plain</i>
Waldron, F. Elliott	E. E.	1924	<i>Gloucester</i>
Walker, Lawrence D.	Ch. E.	1924	<i>Watertown</i>
Waller, Frederick M.	M. E.	1925	<i>Gaylordsville, Conn.</i>
Waller, Ivan R.	A. E.	1925	<i>Milton</i>
Warner, David G.	M. E.	1924	<i>Sterling</i>
Warner, W. Darrington	E. E.	1924	<i>Newburyport</i>
Watson, Francis	M. E.	1925	<i>Jamaica Plain</i>
Wagh, Leslie W.	C. E.	1925	<i>East Boston</i>
Way, Alexander B., Jr.	M. E.	1925	<i>Reading</i>
Weiner, Mitchell	E. E.	1925	<i>Roxbury</i>
Wentworth, Clarence S.	M. E.	1922	<i>Revere</i>
Weschrob, Charles W.	M. E.	1925	<i>Dedham</i>
Weston, Philip O.	E. E.	1924	<i>Mattapan</i>
Wetmore, George H.	E. E.	1924	<i>Peabody</i>
Wheeler, Clifford E.	Ch. E.	1922	<i>Malden</i>
Wheeler, Harold W.	Ch. E.	1924	<i>Winthrop</i>
White, Albert	Ch. E.	1925	<i>Mattapan</i>
White, Earl M.	E. E.	1925	<i>Abington</i>
White, George W.	A. E.	1925	<i>E. Woodstock, Conn.</i>
White, William C.	E. E.	1925	<i>Dorchester</i>
Whitehead, Arthur F.	C. E.	1925	<i>Atlantic</i>
Whiting, Raymond C.	M. E.	1925	<i>Upton</i>
Whitney, Stanley Y.	E. E.	1925	<i>Medford</i>
Whiton, Wilson	M. E.	1923	<i>Hingham</i>
Wickerson, Clarence R.	C. E.	1925	<i>Eastport, Me.</i>
Wilcox, Arthur L.	C. E.	1924	<i>Maynard</i>
Wilcox, Vaughan L.	A. E.	1925	<i>Mars Hill, Me.</i>
Wiley, Laurence V.	C. E.	1924	<i>Skowhegan, Me.</i>
Williams, Charles I.	M. E.	1922	<i>Quincy</i>
Williams, Clifton S.	E. E.	1925	<i>Hartford, Conn.</i>

## SCHOOL OF ENGINEERING

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Williams, Edwin C.	C. E.	1922	<i>Natick</i>
Willis, Howard A.	Ch. E.	1923	<i>Melrose Highlands</i>
Wilson, David C.	M. E.	1925	<i>South Norwalk, Conn.</i>
Wineblatt, Michael	E. E.	1924	<i>Salem</i>
Winslow, Francis G.	A. E.	1925	<i>South Hanover</i>
Winslow, Lawrence A.	E. E.	1925	<i>Watertown</i>
Witherell, Eugene E.	M. E.	1925	<i>Rehoboth</i>
Witherell, Roger	C. E.	1925	<i>Taunton</i>
Wood, Manson E.	E. E.	1923	<i>Wakefield</i>
Wooding, George S.	C. E.	1925	<i>Wallingford, Conn.</i>
Woodworth, Ernest H.	E. E.	1925	<i>Newton</i>
Works, Herbert F.	E. E.	1925	<i>Marlboro</i>
Wright, Moses E., Jr.	E. E.	1922	<i>Newburyport</i>
Wright, Maurice H.	Ch. E.	1924	<i>Springfield</i>
Wylde, Carlton T.	C. E.	1925	<i>North Adams</i>
Wyner, Henry I.	A. E.	1925	<i>Allerton</i>
Young, Claude	M. E.	1924	<i>Quincy</i>
Young, George F., Jr.	E. E.	1925	<i>Somerville</i>
Young, Herbert M.	Ch. E.	1925	<i>Maynard</i>
Young, Horace B.	M. E.	1923	<i>Atlantic</i>
Young, Kenneth C.	E. E.	1925	<i>Portsmouth, N. H.</i>
Young, Walter H.	E. E.	1924	<i>Matinicus, Me.</i>
Young, Wilfred A.	E. E.	1923	<i>Baltic, Conn.</i>
Zak, Alexander M.	C. E.	1925	<i>Boston</i>
Ziegler, George L.	M. E.	1925	<i>Concord Junction</i>
Ziegler, Theodore W.	M. E.	1925	<i>East Lynn</i>
Ziegra, Albert G.	Ch. E.	1924	<i>Deep River, Conn.</i>

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**NORTHEASTERN COLLEGE**  
**SCHOOL OF ENGINEERING**

Boston, Mass., .....192

To the Dean:

Name in full .....

hereby respectfully applies for admission to the.....  
Engineering Curriculum of the School of Engineering for the school  
year 19    -19    , and submits the following data:

Residence ..... Street

Town .....

State ..... Tel. ....

Date of Birth ..... Age .....

Parent (father's) Name .....

“        “        Address .....

Graduate of..... High School.    Year.....

Location of High School.....

If not a graduate, how many years were you in High School?.....

When did you leave? .....

Why did you leave? .....

Name of Principal.....

If employed since graduation, what is the name of your em-  
ployer? .....

Employer's address .....

Names and addresses of two other persons, not clergymen, to  
whom we may direct inquiries concerning you. (Give former  
employers' if possible.)

.....  
.....  
.....

If admitted to the school, do you plan to complete the full four  
years' curriculum and qualify for the degree?.....



# NORTHEASTERN COLLEGE

## AND AFFILIATED SCHOOLS

---

### DAY SCHOOL

#### SCHOOL OF ENGINEERING

Four-year courses in Civil, Mechanical, Electrical, Chemical, and Administrative Engineering leading to the degrees of Bachelor of Civil, Mechanical, Electrical, and Chemical Engineering: B.C.E., B.M.E., etc. The school is conducted in co-operation with engineering firms. Students earn while learning. Open to high-school graduates.

Work conducted at Boston.

### EVENING SCHOOLS

#### SCHOOL OF LAW (CO-EDUCATIONAL)

Four-year course leading to the degree of Bachelor of Laws. Complete preparation for the Bar Examinations and the practice of law. Case method of instruction. Day school standards of scholarship. Courses organized for business men and women who desire a legal training. Open to high-school graduates or those with an equivalent education. A limited number of men and women of maturity and experience admitted each year as special students, not candidates for the LL.B. degree.

Work conducted at Boston, and in Divisions at Worcester, Springfield, and Providence.

#### SCHOOL OF COMMERCE AND FINANCE

Four-year curriculums in Professional Accounting and Business Administration, leading to the degrees of Bachelor and Master of Commercial Science. Open to high school graduates or those with an equivalent education.

A limited number of students with business experience may be admitted as special students, not candidates for the degrees. Special two-year curriculums and unit courses are open to students who desire to specialize in a particular field.

Work conducted at Boston, and at the Divisions and Branches at Worcester, Springfield, Providence, Bridgeport, New Haven, Lynn, Cambridge, Malden, and Newton.

### AFFILIATED SCHOOLS

#### EVENING POLYTECHNIC SCHOOL

A school offering three-year courses in Civil, Mechanical, Electrical, Chemical, Structural, Industrial, and Automotive Engineering, leading to a diploma. The school trains men for positions of trust and responsibility.

Work conducted at Boston and in Divisions at Worcester, Springfield, New Haven, and Bridgeport. (The school in Worcester is known as the "Evening School of Applied Science.")

#### NORTHEASTERN PREPARATORY SCHOOL

Courses of high school grade in English, Ancient and Modern Languages, Mathematics, History, Economics, Government, Chemistry, Physics, Penmanship, Bookkeeping, Shorthand, and Mechanical Drawing. Instructors from high schools. The school offers facilities for a four-year course in the evening, and is in session for three terms of sixteen weeks each year. It is possible for students to meet college entrance requirements in from three to five years of evening work.

Work conducted at Boston and in Divisions at Worcester and New Haven.

#### VOCATIONAL INSTITUTE

A school offering short, intensive courses of a special nature to men whose time is limited. Courses include: Public Speaking for Business Men, Salesmanship, Foremanship, Home-Building, Real Estate, Investments, etc.

Automotive School for Owners, Chauffeurs, Salesmen, Mechanics, with special day and evening courses in Auto Up-keep, Driving, Repair, Starting, Lighting, and Ignition, Acetylene Welding, Auto Painting, Auto Upholstery, Battery Repair. Courses are from four to thirty-six weeks in length and students may enter any Monday.

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*For further information concerning any of the above schools, address*

### NORTHEASTERN COLLEGE

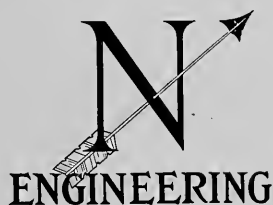
316 Huntington Avenue, Boston 17, Massachusetts  
or nearest division or branch

# SCHOOL OF ENGINEERING

FOUNDED FOR THE INSTRUCTION  
OF MEN IN THE THEORY AND  
PRACTICE OF ENGINEERING

# **NORTHEASTERN UNIVERSITY**

. . . Announcement of . . .  
**Full-Time Plan and New Courses  
In addition to Co-operative Plan**



**1922 - 1923**

**SCHOOL OF ENGINEERING  
Northeastern University**

**Boston Young Men's Christian Association**

**316 Huntington Avenue, - Boston, Mass.**

# Northeastern University

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## *The School*

The School of Engineering, Northeastern University, was founded in 1909 upon what was then a new idea in technical education, the Co-operative Plan. By this plan, a student spends approximately one-half of his time in college acquiring the theory of his profession and the rest of his time at work with the best professional firms about Boston. Since its founding, the school has enjoyed a phenomenal growth and has received from the Massachusetts Legislature the privilege of awarding engineering degrees to its graduates. Today with over eight hundred students, with excellent equipment for all kinds of engineering work, and with a faculty of twenty-eight highly trained and able men, most of whom have had experience in professional practice, the school ranks as one of the foremost engineering colleges in New England.

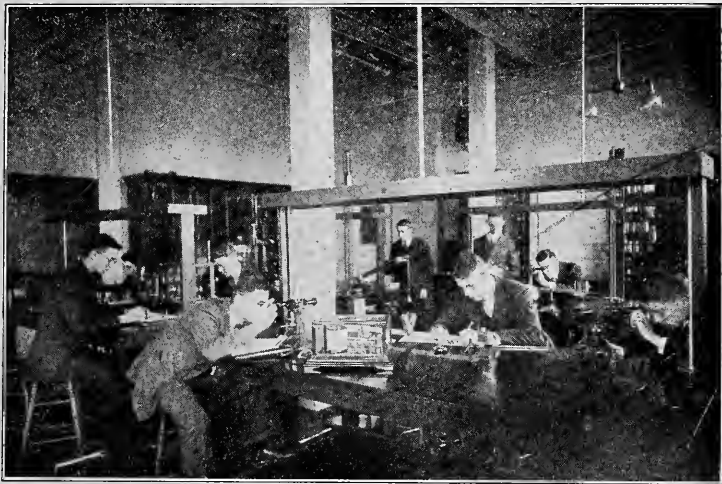
## *Engineers with Administrative Training Needed*

At the present time, there is a great and growing demand for engineers with a knowledge of accounting, system building, and management, to act as executive officers, managers, superintendents and efficiency engineers in our industrial plants, transportation systems, and public utilities. Although many attractive positions are open to men qualified for this work, the demand far exceeds the supply.

In order to meet the need, the faculty of the School of Engineering has deemed it advisable to extend the work of the university and has planned a regular full-time plan so that a student may attend school full time for thirty-five consecutive weeks beginning in September or October, in either or both his sophomore and junior years, complete all of the prescribed engineering curriculum for his department and fifteen weeks of study in administrative and liberal arts subjects each year. This will provide a training for men who desire to enter positions which demand a knowledge of business, scientific and engineering principles. It combines the instruction in engineering subjects with the study of accounting, law, and

# School of Engineering

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Class in Physics Laboratory  
NORTHEASTERN UNIVERSITY

methods of business, adding certain cultural subjects without which an education is incomplete.

The courses are planned to train students to analyze commercial, industrial, and employment problems. Special emphasis is placed upon system building, scientific management, and labor problems, industrial organization and business management. The courses are not designed to produce auditors and accountants but rather to be of service to administrative officers in analyzing accounts and financial reports.

## ***Freshmen Schedule***

A student may enter college for his first year's work September 11, 1922. In such a case, he will complete the freshman school

# Northeastern University

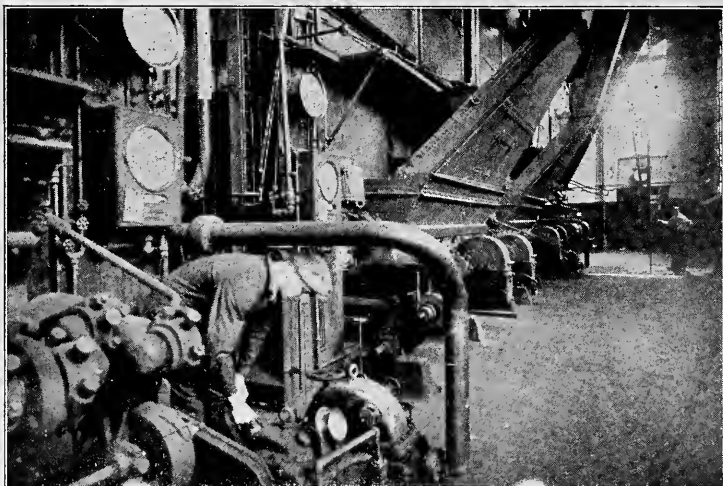
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work January 27, 1923. He will then be free to work until August 13, 1923, when he will return to school for his freshman summer school term of four weeks. Students who follow this schedule are in Division A.

He may enter college for his first year's work January 29, 1923, and he will then remain in school for twenty-four weeks until July 14. He will then be free to work until October 13, 1923. Men who follow this schedule are in Division B.

Freshmen who fail in any work of the first year will be required to repeat such work during the summer terms as follows:

Division A students	June 18, 1923 to July 14, 1923
Division B students	Aug. 13, 1923 to Sept. 8, 1923



Oiling Mechanical Stoker Operating Motor  
BOSTON WOVEN HOSE & RUBBER CO.

# School of Engineering

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## *Options in Sophomore and Junior Years*

Beginning in September, 1922, a student entering the School of Engineering will be given, during his sophomore and junior years, his choice of two plans: (1) the present Co-operative Plan, or (2) the new Full-time Plan.

## *Co-operative Plan*

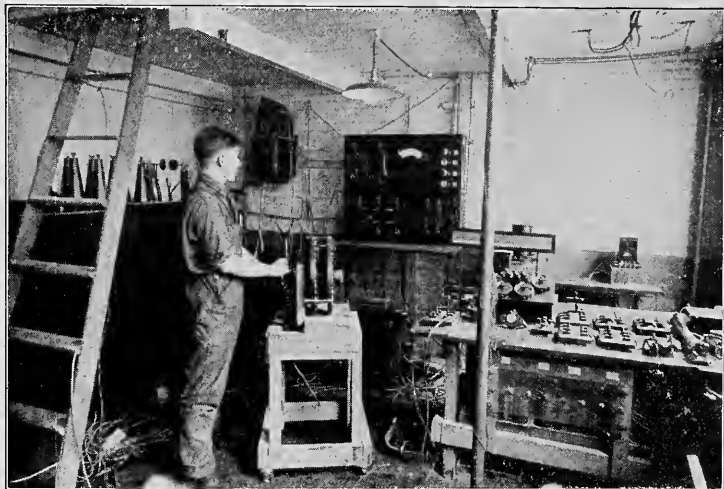
The school has conducted four-year college curriculums of study in Civil, Mechanical, Electrical, and Chemical Engineering on the Co-operative Plan with unusual success since it was originally founded. All of these curriculums will be continued as at present and students will continue to be admitted to all of these professional departments in September and January each year. The only change in the curriculums will be that after September 1922, sophomore and junior students will not be required to attend the summer school unless they have previously failed in one or more subjects in their curriculums.

A student on the Co-operative Plan will be in school five weeks and then will be placed at work with a co-operating firm for five weeks during his sophomore, junior, and senior years. Such a student will alternate throughout the year until he has completed twenty weeks at school and twenty weeks at Engineering Practice. Division A students electing the Co-operative Plan will begin their school work September 11, while Division B men will remain at Engineering Practice until October 13.

During the summer of twelve weeks, each student on the Co-operative Plan will work with his co-operating firm for six weeks and will have a vacation period of six weeks.

# Northeastern University

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Testing Electric Cable  
SIMPLEX WIRE & CABLE CO.

Students who have failed in subjects during the school year will be required to repeat such subjects during their vacation periods the following summer at the regular summer school sessions of four weeks.

## ***Full-time Plan***

Under the Full-time Plan, the student will enter college during his first year in September or in January and complete his course in accordance with the dates given above for freshmen.

During his sophomore and junior years, however, the Full-time student will attend school for thirty-five consecutive weeks beginning in September or October, complete all of the prescribed

# School of Engineering

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engineering curriculum for his department and fifteen weeks of study in administrative and liberal arts subjects each year. He will cover all the courses in the engineering curriculum with either Division A or B and in the five week periods between the engineering periods while the co-operative student is at work, the full-time student will take the courses of administrative and cultural value. Each year there will be three periods of five weeks each devoted to such work.

Sophomores and juniors in Division A who elect the Full-time Plan will return to school September 11 and will complete their work May 13. Sophomores and juniors in Division B will return to school October 15 and will complete their work June 16.

During the summer of seventeen weeks following the sophomore and junior years, the student on the Full-time Plan will be free to work if he desires.

All students, Co-operative as well as Full-time, are required to work with co-operative firms during the senior year beginning with the opening of the school year in September.

## *Full-time Curriculum*

### *SOPHOMORE YEAR*

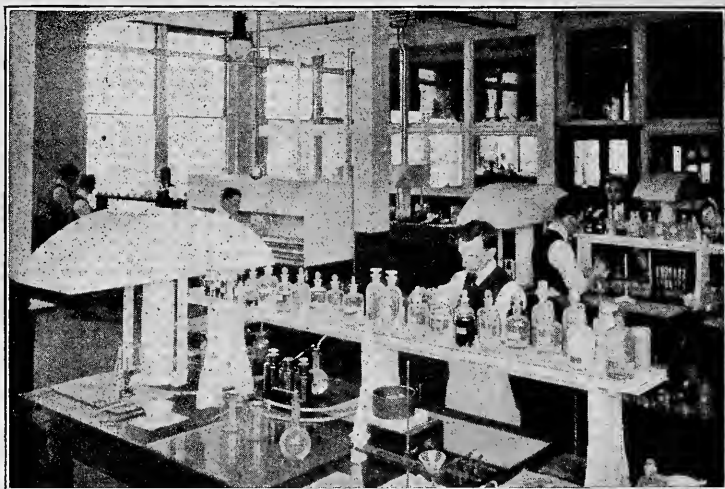
<i>First Period</i>		<i>Second Period</i>		<i>Third Period</i>	
Industrial Organization	3	Industrial Finance	3	Banking	3
Principles of Accounting I	3	Principles of Accounting II	3	Cost Accounting	3
Literature I	3	Literature II	3	Literature III	3
Modern History I	3	Modern History II	3	Journalism	3
Sociology I	3	Sociology II	3	Municipal Government	3

# Northeastern University

## \*JUNIOR YEAR

<i>First Period</i>		<i>Second Period</i>		<i>Third Period</i>	
Business Administration I	3	Business Administration II	3	Industrial Relations	3
Business Management I	3	Business Management II	3	Securities	3
Marketing I	3	Marketing II	3	Business Law	3
Public Speaking	3	Public Speaking	3	Public Speaking	3
Psychology I	3	Psychology II	3	Ethics	3

\*All juniors will take the subjects listed for sophomores during the year 1922-1923. Junior subjects will be omitted.



Testing Metals  
GENERAL ELECTRIC COMPANY, LYNN

# **School of Engineering**

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## ***Engineering Degrees***

Students electing either the Co-operative or the Full-time Plan will pursue one of the four recognized engineering curriculums leading to one of the following degrees:

Bachelor of Civil Engineering  
Bachelor of Mechanical Engineering  
Bachelor of Electrical Engineering  
Bachelor of Chemical Engineering.

The technical studies for the men in both plans are identical.

---

## ***ADVANTAGES OF FULL-TIME PLAN***

### ***Training in Administrative Subjects***

Each student, electing the Full-time Plan, will be given a thorough training in the theory of business management, business law, accounting, marketing, etc. The student electing this plan will receive his degree in one of the four recognized branches of engineering, assuring him the mastery of his professional field. In addition, he will have had instruction in the problems which confront the executive in business, and thus will be equipped to assume responsibilities of an administrative nature.

### ***Broader Liberal Education***

A common criticism that the engineer is made narrow by the strictness of his confinement to technical subjects during his college course does not apply to the full-time man for, in addition to his professional subjects, he is given an opportunity to study such subjects as literature, psychology, sociology, etc.

# Northeastern University

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## ***Opportunity for Work***

The student on the Full-time Plan is free for seventeen weeks each year, from May to September, or from June to October. This provides an excellent opportunity for him to engage in remunerative employment if he so desires.

## ***Full Time College Year***

For two years, the full-time man is required to spend his entire time during the college year at his studies. There is an undeniable mental gain to be derived from continual application to books over a period of thirty-five weeks. In addition, the full-time student will be better able to keep in touch with some phases of college life.

## ***Engineering Practice***

Believing that actual experience with the co-operating firms is invaluable to the graduates of the School of Engineering, the full-time man as well as the man on the Co-operative Plan is required to spend his senior year at Engineering Practice during the alternate periods between his periods of study in the engineering curriculum.

## ***Tuition***

The tuition for students electing the Full-time Plan will be Two hundred twenty-five Dollars (\$225), payable as follows:

<i>Division A Students</i>		<i>Division B Students</i>	
Sept. 11, 1922.....	\$60	Oct. 16, 1922.....	\$60
Nov. 20, 1922.....	60	Dec. 27, 1922.....	60
Jan. 29, 1923.....	55	Mar. 5, 1923.....	55
Apr. 9, 1923.....	50	May 14, 1923.....	50

# School of Engineering

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## *Time for Selecting Option*

Each student must definitely decide whether he intends to attend the Engineering School the subsequent year under the Co-operative or Full-time Plan on or before June 1st each year.

## *Requirements for Admission*

The requirements for admission are the same for all students whether on the Co-operative Plan or on the Full-time Plan.

## *Transfers*

A student pursuing the Co-operative or Full-time Plan will be allowed to change from one to the other at the beginning of the year only, except for such men as may be required by the school authorities to pursue one or the other of the plans.

For a complete catalog of the school or any further information, address

Carl S. Ell, *Dean*,  
School of Engineering  
Northeastern University,  
Boston 17, Mass.



# **Northeastern University**

**January, 1923**

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**CATALOG**

of the

**SCHOOL OF  
ENGINEERING**

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**1923-1924**

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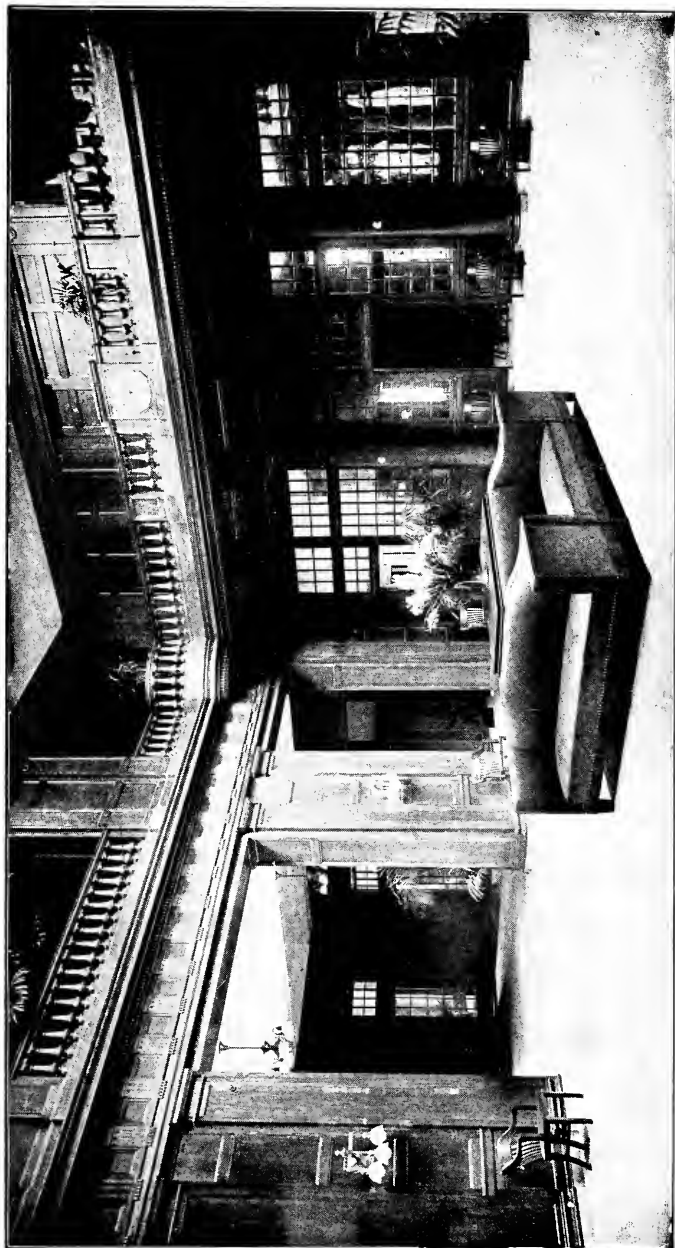
**NORTHEASTERN UNIVERSITY**

**Boston Young Men's Christian  
Association**

**Number 316 Huntington Ave., Boston, Massachusetts**







THE LOBBY  
NORTHEASTERN UNIVERSITY

# NORTHEASTERN UNIVERSITY

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## CATALOG *of the* SCHOOL OF ENGINEERING

Co-operative Plan  
Full-Time Plan



1923 - 1924

NORTHEASTERN UNIVERSITY  
Boston Young Men's Christian Association

# YEARLY CALENDAR

*of Engineering Practice Periods  
for Upper-Classmen*

1923

1924

JANUARY							JULY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	1	2	3	4	5	6	1	2	3	4	5	6	7
7	8	9	10	11	12	13	8	9	10	11	12	13	14
14	15	16	17	18	19	20	15	16	17	18	19	20	21
21	22	23	24	25	26	27	22	23	24	25	26	27	28
28	29	30	31	...	...	...	29	30	31	...	...	...	...

FEBRUARY							AUGUST						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	3	5	6	7	8	9	10	11
4	5	6	7	8	9	10	12	13	14	15	16	17	18
11	12	13	14	15	16	17	19	20	21	22	23	24	25
18	19	20	21	22	23	24	26	27	28	29	30	31	...
25	26	27	28	...	...	...	...	...	...	...	...	...	...

MARCH							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	3	..	..	..	..	1	2	3
4	5	6	7	8	9	10	2	3	4	5	6	7	8
11	12	13	14	15	16	17	9	10	11	12	13	14	15
18	19	20	21	22	23	24	16	17	18	19	20	21	22
25	26	27	28	29	30	31	23	24	25	26	27	28	29
...	...	...	...	...	...	...	30	31	...	...	...	...	...

APRIL							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	..	1	2	3	4	5	6
8	9	10	11	12	13	14	7	8	9	10	11	12	13
15	16	17	18	19	20	21	14	15	16	17	18	19	20
22	23	24	25	26	27	28	21	22	23	24	25	26	27
29	30	...	...	...	...	...	28	29	30	31	...	...	...

MAY							NOVEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	1	2	3	4	5	..	..	..	..	1	2	3
6	7	8	9	10	11	12	4	5	6	7	8	9	10
13	14	15	16	17	18	19	11	12	13	14	15	16	17
20	21	22	23	24	25	26	18	19	20	21	22	23	24
27	28	29	30	31	...	...	25	26	27	28	29	30	...

JUNE							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	..	1	2	..	..	..	..	..	1	..
3	4	5	6	7	8	9	2	3	4	5	6	7	8
10	11	12	13	14	15	16	9	10	11	12	13	14	15
17	18	19	20	21	22	23	16	17	18	19	20	21	22
24	25	26	27	28	29	30	23	24	25	26	27	28	29
...	...	...	...	...	...	...	30	31	...	...	...	...	...

JANUARY							JULY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	1	2	3	4	5	..	..	1	2	3	4	5
6	7	8	9	10	11	12	6	7	8	9	10	11	12
13	14	15	16	17	18	19	13	14	15	16	17	18	19
20	21	22	23	24	25	26	20	21	22	23	24	25	26
27	28	29	30	31	...	...	27	28	29	30	31	...	...

FEBRUARY							AUGUST						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	..	1	2	5	6	7	8	9	10	11
3	4	5	6	7	8	9	12	13	14	15	16	17	18
10	11	12	13	14	15	16	19	20	21	22	23	24	25
17	18	19	20	21	22	23	26	27	28	29	30	31	...
24	25	26	27	28	29	...	...	...	...	...	...	...	...

MARCH							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	..	1	..	..	1	2	3	4	5	6
2	3	4	5	6	7	8	7	8	9	10	11	12	13
9	10	11	12	13	14	15	14	15	16	17	18	19	20
16	17	18	19	20	21	22	21	22	23	24	25	26	27
23	24	25	26	27	28	29	28	29	30	...	...	...	...
30	31	...	...	...	...	...	...	...	...	...	...	...	...

APRIL							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	1	2	3	4	5	..	..	1	2	3	4	..
6	7	8	9	10	11	12	5	6	7	8	9	10	11
13	14	15	16	17	18	19	12	13	14	15	16	17	18
20	21	22	23	24	25	26	19	20	21	22	23	24	25
27	28	29	30	...	...	...	26	27	28	29	30	31	...

MAY							NOVEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	3	..	..	..	..	..	1	..
4	5	6	7	8	9	10	2	3	4	5	6	7	8
11	12	13	14	15	16	17	9	10	11	12	13	14	15
18	19	20	21	22	23	24	16	17	18	19	20	21	22
25	26	27	28	29	30	31	23	24	25	26	27	28	29
...	...	...	...	...	...	...	30	...	...	...	...	...	...

JUNE							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	1	2	3	4	5	6	..
8	9	10	11	12	13	14	7	8	9	10	11	12	13
15	16	17	18	19	20	21	14	15	16	17	18	19	20
22	23	24	25	26	27	28	21	22	23	24	25	26	27
29	30	...	...	...	...	...	28	29	30	31	...	...	...

School Periods for Division A indicated by type thus: 1 2 3.  
School Periods for Division B indicated by type thus: 1 2 3.  
Sundays and Holidays indicated by type thus: 1 2 3.

# YEARLY CALENDAR

*of School Sessions (Co-operative Plan)*

1923

1924

JANUARY							JULY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	1	2	3	4	5	6	1	2	3	4	5	6	7
7	8	9	10	11	12	13	8	9	10	11	12	13	14
14	15	16	17	18	19	20	15	16	17	18	19	20	21
21	22	23	24	25	26	27	22	23	24	25	26	27	28
28	29	30	31	...	...	...	29	30	31	...	...	...	...

FEBRUARY							AUGUST						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	3	..	..	..	1	2	3	4
4	5	6	7	8	9	10	5	6	7	8	9	10	11
11	12	13	14	15	16	17	12	13	14	15	16	17	18
18	19	20	21	22	23	24	19	20	21	22	23	24	25
25	26	27	28	...	...	...	26	27	28	29	30	31	..

MARCH							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	3	..	..	..	..	..	1	..
4	5	6	7	8	9	10	2	3	4	5	6	7	8
11	12	13	14	15	16	17	9	10	11	12	13	14	15
18	19	20	21	22	23	24	16	17	18	19	20	21	22
25	26	27	28	29	30	31	23	24	25	26	27	28	29

APRIL							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	..	1	2	3	4	5	6
8	9	10	11	12	13	14	7	8	9	10	11	12	13
15	16	17	18	19	20	21	14	15	16	17	18	19	20
22	23	24	25	26	27	28	21	22	23	24	25	26	27
29	30	...	...	...	...	...	28	29	30	31	...	...	...

MAY							NOVEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	1	2	3	4	5	..	..	..	..	1	2	3
6	7	8	9	10	11	12	4	5	6	7	8	9	10
13	14	15	16	17	18	19	11	12	13	14	15	16	17
20	21	22	23	24	25	26	18	19	20	21	22	23	24
27	28	29	30	31	...	...	25	26	27	28	29	30	..

JUNE							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	..	..	..	..	..	..	1	..
3	4	5	6	7	8	9	2	3	4	5	6	7	8
10	11	12	13	14	15	16	9	10	11	12	13	14	15
17	18	19	20	21	22	23	16	17	18	19	20	21	22
24	25	26	27	28	29	30	23	24	25	26	27	28	29

JANUARY							JULY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	1	2	3	4	5	..	..	1	2	3	4	5
6	7	8	9	10	11	12	6	7	8	9	10	11	12
13	14	15	16	17	18	19	13	14	15	16	17	18	19
20	21	22	23	24	25	26	20	21	22	23	24	25	26
27	28	29	30	31	...	...	27	28	29	30	31	...	...

FEBRUARY							AUGUST						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	..	..	..	..	..	1	2	..
3	4	5	6	7	8	9	3	4	5	6	7	8	9
10	11	12	13	14	15	16	10	11	12	13	14	15	16
17	18	19	20	21	22	23	17	18	19	20	21	22	23
24	25	26	27	28	29	..	24	25	26	27	28	29	30

MARCH							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	..	..	..	..	1	2	3	4	5
2	3	4	5	6	7	8	7	8	9	10	11	12	13
9	10	11	12	13	14	15	14	15	16	17	18	19	20
16	17	18	19	20	21	22	21	22	23	24	25	26	27
23	24	25	26	27	28	29	28	29	30	...	...	...	...

APRIL							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	1	2	3	4	5	..	..	1	2	3	4	..
6	7	8	9	10	11	12	5	6	7	8	9	10	11
13	14	15	16	17	18	19	12	13	14	15	16	17	18
20	21	22	23	24	25	26	19	20	21	22	23	24	25
27	28	29	30	...	...	...	26	27	28	29	30	31	..

MAY							NOVEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	3	..	..	..	..	..	1	..
4	5	6	7	8	9	10	2	3	4	5	6	7	8
11	12	13	14	15	16	17	9	10	11	12	13	14	15
18	19	20	21	22	23	24	16	17	18	19	20	21	22
25	26	27	28	29	30	31	23	24	25	26	27	28	29

JUNE							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	..	1	2	3	4	5	6
8	9	10	11	12	13	14	7	8	9	10	11	12	13
15	16	17	18	19	20	21	14	15	16	17	18	19	20
22	23	24	25	26	27	28	21	22	23	24	25	26	27
29	30	...	...	...	...	...	28	29	30	31	...	...	...

Engineering Practice Periods for Division A indicated by type thus: 1 2 3.  
Engineering Practice Periods for Division B indicated by type thus: 1 2 3.  
Periods when school is not in session indicated by type thus: 1 2 3.

# School of Engineering

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## CALENDAR, 1923-1924

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### General Notes

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Division B is at Engineering Practice while Division A is at school.  
Division A is at Engineering Practice while Division B is at school.  
Periods at school or at Engineering Practice are shown by different kinds of type on Yearly Calendars.

First-year students co-operate on the twenty-week plan.

Students above the first year co-operate on the five-week plan.

All Engineering Practice periods for upperclassmen are of five weeks' duration, except in summer, when one period for each division is six weeks.

All students while at Engineering Practice have no holidays except those regularly allowed by employing firms.

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### Special Notes for 1923

#### Upperclasses.

June 18—July 28	Division A Vacation Division B at Engineering Practice
July 30—Sept. 8	Division A at Engineering Practice Division B Vacation
June 19—July 14	Division A Review Courses
August 13—Sept. 8	Division B Review Courses

#### Freshman Class.

June 19—July 14	Division B Summer School Division A Review Courses
July 16—August 11	Vacation
August 13—Sept. 8	Division A Summer School Division B Review Courses

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## CALENDAR, 1923

- January 1, Monday  
New Year's Day (School exercises omitted)
- January 18, Thursday  
Entrance Examinations
- January 22-27, Monday-Saturday  
Examination Period for Division A Freshmen and Division B Upperclassmen
- January 29, Monday  
Opening of the First Semester for Division B Freshmen  
Third Period (Second Semester) begins for Division A Upperclassmen  
Second Term begins for Division BB Upperclassmen

# Northeastern University

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## CALENDAR FOR 1923 (Continued)

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February 22, Thursday

Washington's Birthday (School exercises omitted)

March 5, Monday

Second Period begins for Division B Freshmen

Third Period (Second Semester) begins for Division B Upperclassmen.

Third Term begins for Division AA Upperclassmen

April 2-3-4, Monday-Wednesday

Examination Period for Division B Freshmen

April 5-6-7, Thursday-Saturday

School Exercises Omitted

April 9, Monday

Third Period (Second Semester) begins for Division B Freshmen

Fourth Period begins for Division A Upperclassmen

Third Term begins for Division BB Upperclassmen

April 19, Thursday

Patriot's Day (School exercises omitted)

April 20-21, Friday-Saturday

School Exercises Omitted

May 7-12, Monday-Saturday

Examination Period for Division A Upperclassmen

May 14, Monday

Fourth Period begins for Division B Freshmen

Fourth Period begins for Division B Upperclassmen

May 30, Wednesday

Memorial Day (School exercises omitted)

June 9, Saturday

Field Day (School exercises omitted)

June 11-16, Monday-Saturday

Examination Period for Division B Freshmen and Upperclassmen

June 14, Thursday

Entrance Examinations

June 17, Sunday

Baccalaureate Sermon

June 18, Monday

Observance of Bunker Hill Day (School exercises omitted)

June 19, Tuesday

Summer Term begins for Division B Freshmen

Review courses begin for Division A Upperclassmen

June 20, Wednesday

Annual Commencement

July 4, Wednesday

Independence Day (School exercises omitted)

# School of Engineering

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## CALENDAR FOR 1923 (Continued)

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August 13, Monday

Summer Term begins for Division A Freshmen  
Review courses begin for Division B Upperclassmen

September 3, Monday

Labor Day (School exercises omitted)

September 6, Thursday

Entrance Examinations

September 10, Monday

Opening of the First Semester for Division A Freshmen and Upperclassmen

October 12, Friday

Columbus Day (School exercises omitted)

October 13, Saturday

School Exercises Omitted

October 15, Monday

Second Period begins for Division A Freshmen  
Opening of the First Semester for Division B Upperclassmen  
First Term begins for Division AA Upperclassmen

November 14-16, Wednesday-Friday

Examination Period for Division A Freshmen

November 17, Saturday

School Exercises Omitted

November 19, Monday

Third Period (Second Semester) begins for Division A Freshmen  
Second Period begins for Division A Upperclassmen  
First Term begins for Division BB Upperclassmen

November 29, Thursday

Thanksgiving (School exercises omitted)

December 17-20, Monday-Thursday

Examination Period for Division A Upperclassmen

December 21-25, Friday-Tuesday

Christmas Recess (School exercises omitted)

December 26, Wednesday

Fourth Period begins for Division A Freshmen  
Second Period begins for Division B Upperclassmen  
Second Term begins for Division AA Upperclassmen

# Northeastern University

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## CALENDAR FOR 1924

### Special Notes for 1924

#### Upper Classes.

June 16—July 26	Division A Vacation Division B at Engineering Practice
July 28—Sept. 6	Division A at Engineering Practice Division B Vacation
June 16—July 12	Division A Review Courses
August 11—Sept. 6	Division B Review Courses

#### Freshman Class.

June 16—July 12	Division B Summer School Division A Review Courses
July 14—August 9	Vacation
August 11—Sept. 6	Division A Summer School Division B Review Courses

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#### January 1, Tuesday

New Year's Day (School exercises omitted)

#### January 17, Thursday

Entrance Examinations

#### January 23-26, Wednesday-Saturday

Examination Period for Division A Freshmen and Division B Upperclassmen

#### January 28, Monday

Opening of the First Semester for Division B Freshmen

Third Period (Second Semester) begins for Division A Upperclassmen

Second Term begins for Division BB Upperclassmen

#### February 22, Friday

Washington's Birthday (School exercises omitted)

#### March 3, Monday

Second Period begins for Division B Freshmen

Third Period (Second Semester) begins for Division B Upperclassmen

Third Term begins for Division AA Upperclassmen

#### April 1-3, Tuesday-Thursday

Examination Period for Division B Freshmen

#### April 4-8, Friday-Tuesday

Spring Recess (School exercises omitted)

# School of Engineering

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## CALENDAR FOR 1924 (Continued)

April 9, Wednesday

Third Period (Second Semester) begins for Division B Freshmen

Fourth Period begins for Division B Upperclassmen

Third Term begins for Division BB Upperclassmen

April 19, Saturday

Patriot's Day (School exercises omitted)

May 5-10, Monday-Saturday

Examination Period for Division A Upperclassmen

May 12, Monday

Fourth Period begins for Division B Freshmen

Fourth Period begins for Division B Upperclassmen

May 30, Friday

Memorial Day (School exercises omitted)

May 31, Saturday

School Exercises Omitted

June 7, Saturday

Field Day (School exercises omitted)

June 9-14, Monday-Saturday

Examination Period for Division B Freshmen and Upperclassmen

June 12, Thursday

Entrance Examinations

June 15, Sunday

Baccalaureate Sermon

June 16, Monday

Summer Term begins for Division B Freshmen

Review courses begin for Division A Upperclassmen

June 17, Tuesday

Bunker Hill Day (School exercises omitted)

June 18, Wednesday

Annual Commencement

July 4, Friday

Independence Day (School exercises omitted)

# Northeastern University

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## CALENDAR FOR 1924 (Continued)

August 11, Monday

Summer Term begins for Division A Freshmen

Review courses begin for Division B Upperclassmen

September 1, Monday

Labor Day (School exercises omitted)

September 4, Thursday

Entrance Examinations

September 8, Monday

Opening of the First Semester for Division A Freshmen and  
Upperclassmen

October 13, Monday

Observance of Columbus Day (School exercises omitted)

October 14, Tuesday

Second Period begins for Division A Freshmen

Opening of the First Semester for Division B Upperclassmen

First Term begins for Division AA Upperclassmen

November 17, Monday

Third Period (Second Semester) begins for Division A Freshmen

Second Period begins for Division A Upperclassmen

First Term begins for Division BB Upperclassmen

November 27, Thursday

Thanksgiving (School exercises omitted)

December 25-27, Thursday-Saturday

Christmas Recess (School exercises omitted)

December 29, Monday

Fourth Period begins for Division A Freshmen

Second Period begins for Division B Upperclassmen

Second Term begins for Division AA Upperclassmen

# School of Engineering

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# School of Engineering

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JOSEPH WILLIAM ZELLER, S.B.      Washington St., West Newton.  
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# Northeastern University

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# School of Engineering

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### INSTRUCTORS

CHARLES OSCAR BAIRD, JR. <i>Instructor in Civil Engineering</i>	590 Walnut St., Lynn
CHESTER PACKARD BAKER, B.Ch.E. <i>Instructor in Chemical Engineering</i>	53 Wendell Ave., Brockton
RALPH EUGENE BROWN, B.E.E. <i>Instructor in Mechanical Engineering</i>	79 Center Ave., Abington
CHESTER JAMES GINDER, B.C.E. <i>Instructor in Civil Engineering</i>	23 Russell St., Everett
EMIL ANTON GRAMSTORFF, S.B. <i>Instructor in Civil Engineering</i>	Farmcrest Ave., Lexington
MADISON PETERS JEFFERY, A.B. <i>Instructor in English</i>	58 Glenwood St., Malden
EDWARD SNOW PARSONS, B.C.E. <i>Instructor in Mathematics</i>	705 Washington St., Gloucester
ERNEST FRED PERKINS, S.B., M.S. <i>Instructor in Chemical Engineering</i>	20 Queensbury St., Boston
ROLAND GUYER PORTER, B.E.E. <i>Instructor in Electrical Engineering</i>	317 Common St., Watertown
CHESTER ABEL REYNOLDS, S.B. <i>Instructor in Mechanical Engineering</i>	231 Morrison Ave., Somerville
HENRY EDWARD RICHARDS, S.B. <i>Instructor in Electrical Engineering</i>	Lynnfield Center, Mass.
JOHN JAMES SINNETT <i>Instructor in Physical Training</i>	24 Bardwell St., Jamaica Plain
FREDERICK ARLINGTON STEARNS, S.B. <i>Instructor in Mechanical Engineering</i>	208 Grove St., Melrose
CAMERON STANLEY TOOLE <i>Instructor in Civil Engineering</i>	99 Pearl St., Clinton

# Northeastern University

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## FACULTY OF THE SCHOOL

(Continued)

### ASSISTANTS

CHARLES REID ALLAN <i>Assistant in Physics</i>	37 Hawthorne Rd., Pittsfield
GORDON BYAM ELDREDGE <i>Assistant in Chemistry</i>	Fitchburg Turnpike, Concord
MARVIN ARVILLE FRENCH <i>Assistant in Electrical Engineering</i>	81 Arlington St., Framingham
JULIUS KATZIFF <i>Assistant in Chemistry</i>	11 Sea Foam Ave., Winthrop
ISRAEL LASSOF <i>Assistant in Chemistry</i>	27 Sylvia St., Lexington
ROLAND FRANCIS LETOURNEAU <i>Assistant in Chemistry</i>	29 Rockland Ave., Franklin
DONALD LESTER PECK <i>Assistant in Electrical Engineering</i>	81 Arlington St., Framingham
ALTA ELBRIDGE PROPHET <i>Assistant in Mathematics</i>	27 Grove St., Clinton
JOHN FRANCIS QUINN <i>Assistant in Mathematics</i>	14 Dunlap St., Cambridge
WILLARD ERNEST REUTHER <i>Assistant in Electrical Engineering</i>	Princeton St., Jefferson
CHARLES CLIFTON RUSSELL <i>Assistant in Electrical Engineering</i>	68 High St., Exeter, N. H.
GEORGE LEWIS ZIEGLER <i>Assistant in Physics</i>	25 Highland St., Concord Junction

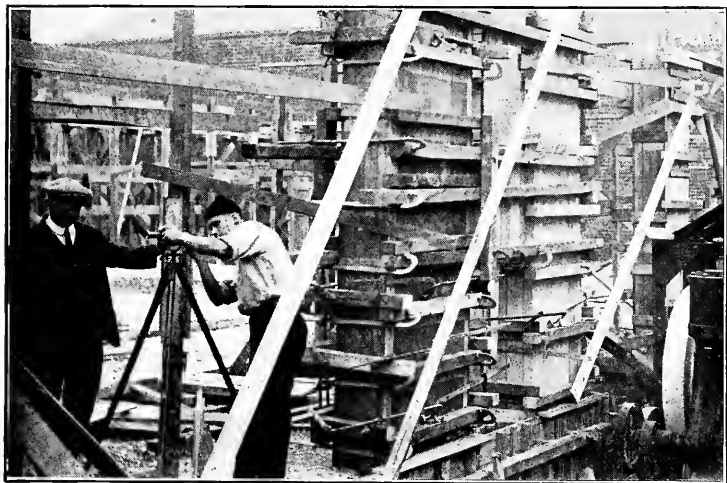
# School of Engineering

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## ADMINISTRATIVE OFFICERS OF THE SCHOOL OF ENGINEERING

CARL STEPHENS ELL, A.B., M.S. <i>Dean</i>	52 Clement Ave., West Roxbury
JOHN BUTLER PUGSLEY, A.B. <i>Registrar</i>	23 Hardy Ave., Watertown
WINTHROP ELIOT NIGHTINGALE, A.B., S.B. <i>Director of Engineering Practice</i>	73 Hovey St., Watertown
MILTON JOHN SCHLAGENHAUF, A.B., B.D., M.A. <i>Assistant Director of Engineering Practice</i>	88 Gainsborough St., Boston
JOSEPH SPEAR, A.B. <i>Director of Student Activities</i>	141 Chiswick Road, Brighton
HAROLD WESLEY MELVIN, A.B. <i>Director of Student Publications</i>	155 Blue Hill Ave., Milton
MADISON PETERS JEFFERY, A.B. <i>Director of Athletics</i>	58 Glenwood St., Malden
CAMERON STANLEY TOOLE <i>Assistant to the Dean</i>	99 Pearl St., Clinton
CHESTER JAMES GINDER, B.C.E. <i>Assistant to the Registrar</i>	23 Russell St., Everett
EDWARD SNOW PARSONS, B.C.E. <i>Assistant to the Director of Student Activities</i>	705 Washington St., Gloucester
ANNIE LAURIE CORBETT <i>Secretary to the Dean</i>	88 Melrose St., Melrose Highlands
FLORENCE WHEELER DERRIN <i>Recorder</i>	276 Walnut St., Brookline
MARIE CORA FAUSEL <i>Assistant Bursar</i>	10 Ridge St., Roslindale
EDNA JANE GARRABRANT <i>Secretary to the Director of Engineering Practice</i>	120 Hancock St., Cambridge
MARJORIE MOULTON GRAFFTE <i>Assistant to the Bursar</i>	41 St. Stephen St., Boston
JESSIE MARY PAINE <i>Secretary to the Registrar</i>	91 Perkins St., East Somerville
ROSA MARIE PENDLETON <i>Secretary to the Director of Student Activities</i>	183 Winthrop St., Winthrop
DOROTHY CLARA PETERS <i>Assistant Librarian</i>	189 Huntington Ave., Boston
MYRA EDNA WHITE <i>Librarian</i>	189 Huntington Avenue, Boston
ELLEN MARGARET PORTER WHITEHOUSE <i>Bookkeeper</i>	66 Everett St., Arlington
ANNA EASTON WHITNEY <i>Bookkeeper</i>	118 Hemmenway St., Boston

# Civil Engineering Students

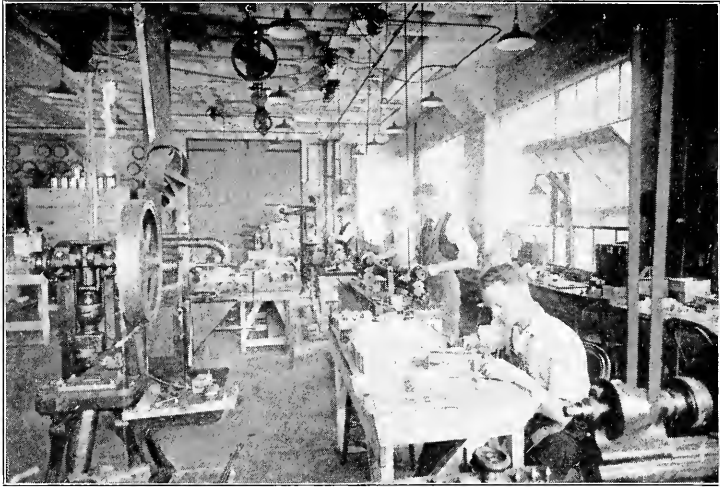


Levelling for Building Construction  
Simpson Bros. Corporation



Class in Surveying Fieldwork  
Northeastern University

# Mechanical Engineering Students



Lathe and Assembly Work  
Sanborn Co., Boston



Manufacture of Thermostatic Control Apparatus  
Spencer Thermostat Co., Cambridge

# Northeastern University

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## DEPARTMENTS OF THE SCHOOL

### MAIN DEPARTMENTS

#### SCHOOL ADMINISTRATION

*Professor Pugsley, in charge*

#### ENGINEERING PRACTICE

*Professor Nightingale, in charge*

#### STUDENT ACTIVITIES

*Professor Spear, in charge*

### PROFESSIONAL DEPARTMENTS

#### CIVIL ENGINEERING

*Professor Alvord, in charge*

#### MECHANICAL ENGINEERING

*Professor Zeller, in charge*

#### ELECTRICAL ENGINEERING

*Professor Smith, in charge*

#### CHEMICAL ENGINEERING

*Professor Strahan, in charge*

### GENERAL DEPARTMENTS

#### DRAWING

*Professor Ashley, in charge*

#### ENGLISH

*Professor Melvin, in charge*

#### MATHEMATICS

*Professor Spear, in charge*

#### PHYSICS

*Professor Coolidge, in charge*

# School of Engineering

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## \*COMMITTEES OF THE FACULTY 1923-1924

### EXECUTIVE COMMITTEE

DEAN ELL, *Chairman*  
PROFESSOR NIGHTINGALE

PROFESSOR PUGSLEY  
PROFESSOR SPEAR

### ADMISSION

DEAN ELL, *Chairman*  
PROFESSOR PUGSLEY                      PROFESSOR MELVIN

### SCHOLARSHIP

PROFESSOR PUGSLEY, *Chairman*  
PROFESSOR COOLIDGE                      PROFESSOR SMITH  
PROFESSOR NIGHTINGALE                      PROFESSOR SPEAR

### ENGINEERING PRACTICE

PROFESSOR NIGHTINGALE, *Chairman*  
PROFESSOR ALVORD                      PROFESSOR SMITH  
PROFESSOR SCHLAGENHAUF                      PROFESSOR STRAHAN  
PROFESSOR ZELLER

### ATHLETICS

PROFESSOR SPEAR, *Chairman*  
PROFESSOR PUGSLEY                      PROFESSOR ZELLER  
MR. JEFFERY                      MR. PORTER

### FRATERNITIES

PROFESSOR BENEDICT, *Chairman*  
PROFESSOR ASHLEY                      PROFESSOR MELVIN  
PROFESSOR FERRETTI                      PROFESSOR STRAHAN  
MR. GINDER

### CATALOG

PROFESSOR FERRETTI, *Chairman*  
PROFESSOR BENEDICT                      PROFESSOR MELVIN  
PROFESSOR GEE                      MR. STEARNS

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\*The Dean is, *ex-officio*, a member of all standing committees.

# Northeastern University

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## SPECIAL LECTURES

GEORGE W. COLEMAN

*President of Babson Institute*

"Facing New Facts"

HENRY H. CRANE

*Rector of Center Methodist Episcopal Church, Malden, Mass.*

"Delusions"

EDWIN H. HUGHES

*Bishop, Methodist Episcopal Church, Boston Area*

"Abraham Lincoln and Higher Education"

CLARENCE C. LITTLE

*President of the University of Maine*

"The Correlation of Facts"

GEORGE SMITH

*Formerly President of the Boston Chamber of Commerce and the  
Boston City Club*

"Finding the Law"

FRANK P. SPEARE

*President of Northeastern University*

"The Challenge to the American College Man"

DEWITT G. WILCOX

*Surgeon*

"The Human Brain"

## SCHOOL OF ENGINEERING

### GENERAL INFORMATION

#### History of Northeastern University

The incorporation of Northeastern University of the Boston Young Men's Christian Association in March, 1916, marked the culmination of a notable development. The University is the realization of an ideal carefully worked out and persistently followed for many years. One of the first lines of endeavor of the Boston Young Men's Christian Association, after its establishment in 1851, was the opening of evening classes for young men. It was not, however, until 1896 that the actual foundations for the University were laid. The larger number of courses offered required a more comprehensive organization. Gradually the courses were grouped under separate schools and additional courses were offered to complete the curriculum of each school.

The School of Law, established in 1898, was incorporated in 1904 with degree granting power. Founded in 1907, the School of Commerce and Finance was authorized in 1911 to confer the degrees of Bachelor and Master of Commercial Science. The School of Engineering opened in 1909 and was given power in 1920 to confer the following degrees: Bachelor of Civil Engineering, Bachelor of Mechanical Engineering, Bachelor of Electrical Engineering, and Bachelor of Chemical Engineering. The School of Business Administration was opened in September 1922, with the right to grant the degree of Bachelor of Commercial Science. In addition, the Evening Polytechnic School, the Huntington School for Boys, the Northeastern Preparatory School, The Department of University Extension, and the Vocational Institute are conducted under the administration of the University. Divisions of the University offering evening instruction have been established at Worcester, Springfield, Bridgeport, New Haven, Providence and branches at Lynn and Malden.

In fourteen years the School of Engineering, which was started with no special educational requirements for entering students and which had but little equipment and a registration of only eight pupils, has grown to be a recognized factor in

## GENERAL INFORMATION

the community, with rigid requirements of scholarship and character for entering students, thousands of dollars' worth of equipment, a highly-trained and able faculty, and an enrollment of over nine hundred students. It is enabling the young man of moderate financial ability to get a college engineering training and at the same time not only to defray his own expenses, but also to become familiar with the actual practice of his profession.

### Object of the School

Technical school instruction, depending on class-room work and laboratories, must always lack some of the vital characteristics of an actual manufacturing plant. One is carried on for educational purposes, while the other is operated for dividends. It is this latter fact that gives the co-operative school idea one great advantage over the usual educational plan. Instead of training the student for several years for work in which he may later find himself entirely unfitted, the School puts the student to work in a commercial plant. There he learns life in its vital issues, as well as the problem of getting along with men, thus early finding out whether he has made a wise or unwise choice of his life work. This training shows him the use and value of his school work, and finally gives him an unusual opportunity to acquire from actual experience that rare characteristic, *executive ability*, without which his life probably would be spent on the lower levels of industry.

The fundamental aim of this School is to give young men sound training in both the theoretical and practical principles upon which professional practice is based. Thus they are enabled to advance farther and more rapidly in their chosen work than they could expect to do without further education than that of a high-school course. The training is not in any sense that of a trade school, but is that of a regular engineering school of high standards.

The School offers four branches of engineering: civil, mechanical, electrical, and chemical. The end sought is to give to students who have already had a high school preparation, or its equivalent, a good training in the fundamental sciences

## SCHOOL OF ENGINEERING

of mathematics, chemistry, and physics, and in the important applications of the principles of these sciences to the several branches of engineering. Much stress is laid on the development of the ability to apply the acquired knowledge to new engineering problems, and an effort is made to be thorough without leading the student through a maze of mere mental gymnastics.

The program of studies differs from that of many schools, in that a student is not permitted a wide range of subjects from which to choose. It has been found that better results are obtained by prescribing the principal studies which the student is to pursue.

## CO-OPERATIVE PLAN

To illustrate the co-operative plan of operation of the School, let us take the case of two men, "A" and "B" who desire to take any one of the various courses offered.

If the men are members of any one of the three upper classes (sophomore, junior, or senior), "B" will be assigned to one of the plants of a firm that is co-operating with the School. Here he receives his practical experience by actual work under School supervision for a period of five weeks. "A" who is called the alternate of "B" has meanwhile been attending classes at the School. At the end of the five-week period, "B" and "A" change places, that is, "B" takes the place of "A" at School, while "A" relieves his alternate at the plant of the employing firm. This process is repeated each period, these same two students alternating on the same job for at least one calendar year. "A" and "B" are spoken of as "Division A" and "Division B" men respectively.

In the case of freshmen students, the alternating period is of twenty weeks' duration and the practical work is not necessarily of an engineering character. Division B freshmen will ordinarily continue with such employment as they may obtain for themselves up to the time of admission to the class rooms. Division A freshmen will be allowed to assume during their working period any kind of employment that will give promise of best remuneration. With either division, however, the

## CO-OPERATIVE PLAN

students will be expected, when so advised by the Engineering Practice Department, to take Engineering Practice jobs where the nature of the work does not require any particular previous training.

### Correlation of Practical and Theoretical Work

The employers who co-operate with us agree, where practicable, to employ the students in all the different departments of their establishments during the periods of engineering practice. This training is just as complete as the school work, and is just as thorough. Where possible, the course of the student is from the handling of the raw material to the shipment of the finished product. This practical training includes the use of the machines, as well as the executive duties of the plant, so that at the end of his course the graduate may not only know how to do things, but also why they are done in certain ways. Detailed reports are made by each student for each of his working periods. The subjects for these reports are chosen by the student and may be anything of importance in connection with his job. These reports are criticized and discussed when the student returns to school. Accurate records and grades are kept of the engineering practice of each student, and it is not possible to secure a degree unless this part of the course is completed successfully.

### Number of Positions Available

The number of positions at our disposal in any one branch of engineering is necessarily limited. Thus far desirable positions have been secured for our students as the growth of the School has demanded. Nevertheless, to be at all sure of work in his chosen branch of engineering, an applicant should file his application early.

Sometimes students may secure their own positions with firms, in which case an alternate can usually be furnished by the School, if desired. Such individual arrangements are entirely acceptable to the School, and may be made by any applicant, subject to the approval of the Director of Engineering Practice.

## SCHOOL OF ENGINEERING

### Attitude of Co-operating Firms

The favorable attitude of the co-operating concerns toward our plan is shown by their retention of the same students from year to year, even after graduation, and also in the fact that whenever vacancies occur which can be filled by our men, the firms often apply for additional students to fill them. The men under whose supervision the students have been in their outside work are practically unanimous in approval of our plan, and speak highly of the enthusiasm, earnestness and intelligence the students have shown in the performance of their duties.

### Assignment

When a student is first assigned to a firm, the School gives him general information in regard to the work and a card of introduction. At the first interview the student is expected to familiarize himself with the kind of work on which he is to be engaged while with the firm, and the conditions under which he is to work. It is expected that no student will accept employment through the School unless he can and will continue in School and with the firm in question throughout the year in accordance with the general plans of Engineering Practice. During the periods of Engineering Practice the students report for work at the regular working hours of the firm, no special privileges being granted. Students are not permitted to discontinue Engineering Practice except under unusual conditions and only by previous arrangements with the School. *In all cases of absences from Engineering Practice, whether unavoidable or not, the student or a member of his family is required to notify the employing firm by telephone immediately at or before the time of the occurrence of the absence.* This matter of notifying the employing firm immediately is very important. Failure to do so is sufficient cause for dismissal.

The School places the student at work with the employing firm and is responsible for his presence and conduct at work as well as the quality and scope of his work. All difficulties arising in regard to students who are on Engineering Practice

## CO-OPERATIVE PLAN

are taken up with the School at the next following school period.

Students in the junior and senior years are almost invariably placed with firms which give them experience directly in line with the course of study followed at school.

Freshmen and sophomores, as a rule, are assigned to work not so technical in character, but designed to train the younger men in the fundamental qualities of cheerfulness, dependability, enthusiasm, and grit. These attributes are essential to the successful completion of the upper class work. They are emphasized at every opportunity during the student's college life in connection with his engineering practice, and the first year's training is designed especially to develop these habits. If a young man can form habits of mental and physical alertness and reliability, he has laid a sure foundation for his success and happiness in after life. The detailed technical information and experience is added in the three upper years.

### Credits

The conscientious pursuit and successful completion of engineering practice assignments are necessary for the student to obtain the degree. Seniors are required to take engineering practice from September to June for four alternate five-week periods and receive therefor twenty credits toward the degree. Sophomores and Juniors, who elect the co-operative plan, work for four five-week and one six-week alternate periods, a total of twenty-six weeks and receive therefor twenty-four credits each year toward the degree. Students on the full-time plan, however, do not receive credit toward the degree for the practical experience they may obtain during their summer vacations.

In general, all changes and transfers in Engineering Practice are made at the beginning of the school year in September.

### Earnings

The firms treat our students as they do their other employees in manner of payment, rates of pay, chances for promotions, etc. Each firm makes individual arrangements with the student,

## SCHOOL OF ENGINEERING

and the School does not attempt to supervise except for occasional consultations with the employers over general policies.

*The rates of pay for students in the School are kept low so that the employer feels justified in devoting time to the instruction of the students and in transferring students from one department to another at approximately regular intervals.*

By agreement with the co-operating firms the following minimum wages are paid to students :

- \$10 per week for the first school year.
- 12 per week for the second school year.
- 14 per week for the third school year.
- 16 per week for the fourth school year.

Ordinarily a student starts with each firm at the minimum wage and is promoted as his ability may warrant. In certain cases the students receive less than the minimum stated above, but this is usually made up to them in some other way.

No upper limit of wages is set. The average maximum is \$18 to \$20 even for men of exceptional ability, because the students are given the privilege of attending school on the co-operative plan and of being transferred from one department to another. The sum earned is more than enough to pay the tuition and the necessary expenses of schooling, but does not cover the cost of living.

### Educational Certificates

The law in regard to the hours and conditions of labor by minors makes it necessary that all students under twenty-one years of age shall obtain Educational Certificates before they can be accepted by co-operating firms. For those students who live outside of Boston, it will save time and trouble if they bring a Certificate of Birth, or an Educational Certificate, with them on coming to Boston. The Educational Certificates are obtained free, upon request, from the Superintendent of Schools in the city or town where the student lives, if he lives in Massachusetts. For students living in other states a Certificate of Birth, or its equivalent, is all that will be necessary.

## CO-OPERATIVE PLAN

### Engineering Practice Regulations

(1) A student on assignment to an Engineering Practice job is required to sign the co-operative agreement to retain that job for a calendar year. The first week on the job is the only trial period allowed. If the student feels that he does not want to retain that job for at least the calendar year, he should so notify the Engineering Practice Department during that first week. If without such notice a student still retains the job for more than a week, his co-operative agreement becomes effective automatically, and he is required by the School to fulfill that agreement. Any exceptions may be allowed only upon petition to the Engineering Practice Committee.

This agreement obligates the employer to retain the student on the job only so long as the co-operation is practicable. Employers are advised to discharge students after fair trial for unsatisfactory work, incompetency, inability, or any irregularity. In other words, every student is expected to work conscientiously and to the best of his ability and retain his job in competition with others only through satisfactory service.

(2) A student giving notice of dissatisfaction or desire for different assignment during his trial week is expected to stay on the job until relieved by another student assigned by the Department of Engineering Practice.

(3) Students are required to continue on their Engineering Practice jobs throughout the regular summer periods as shown in the calendar in the catalog, in order to obtain the necessary credit for the degree.

(4) In case of sickness or other emergency requiring absence from work, the EMPLOYER and the Engineering Practice Department must be notified immediately by telephone or messenger.

(5) Students wishing to participate *during working hours* of Engineering Practice periods in student activities must petition the Engineering Practice Department, in order that the necessary steps may be taken to arrange with the employer for such participation if possible.

## SCHOOL OF ENGINEERING

(6) A student discharged or temporarily laid off is expected to notify the Engineering Practice Department immediately.

(7) A student must not voluntarily leave a job for any reason whatsoever without the consent of the Engineering Practice Department.

(8) A student abandoning a job or so conducting himself on his job as to purposely cause his discharge may be immediately indefinitely suspended from college for breach of discipline.

(9) Any dissatisfaction or trouble arising on jobs should be reported to the Engineering Practice Department and adjustments brought about through the department.

### Schedules of Practical Work

Below are typical schedules of practical work that have been arranged for our students by some of the co-operating firms:

#### **Boston & Maine Railroad Co.**

ONE YEAR Erecting Dept.  
ONE YEAR Machine Dept.  
ONE YEAR Machine Dept.  
ONE YEAR Erecting Dept.  
Drafting Room

#### **Simplex Wire & Cable Co.**

ONE YEAR Insulating Dept.  
Braiding Dept.  
ONE YEAR Cable Shop  
Twisting Dept.  
ONE YEAR Machine Shop Construction Gang  
Electrical Construction Gang  
ONE YEAR Testing Room

#### **The Dennison Manufacturing Co.**

ONE YEAR Carpenter's Helper  
Pattern Maker's Helper and Case Making  
Mill-wright Work and Elevator, Fire Door Inspection  
Helper in Electrical Dept.  
ONE YEAR Machine Shop Stock Room  
Machine Shop  
Grinding Room  
ONE YEAR Power Plant Work  
Accident Prevention Work  
Filing Plans, Blue Prints, Tracing, Etc.  
Planning Dept. Work  
ONE YEAR Tracing and General Work  
Detailing and General Drafting

## CO-OPERATIVE PLAN

### **Simplex Electric Heating Co.**

ONE YEAR	Machine Dept.
ONE YEAR	Grinding Dept.
	Stock Dept.
	Winding Dept.
	Enameling Dept.
	Assembling Dept.
ONE YEAR	Testing Dept. First Division
	Testing Dept. Second Division
ONE YEAR	Shipping Dept.
	Drafting Dept.
	General Shop Experience

### **Boston & Albany Railroad Co.**

ONE YEAR	Work in Field Party
ONE YEAR	Work in Drafting Room
ONE YEAR	Masonry Inspection
	General Railroad Work
	Railroad Accounting
ONE YEAR	Railroad Accounting
	Timekeeping and Unit Costs

### **Boston Woven Hose & Rubber Co.**

ONE YEAR	Factory
ONE YEAR	Inspection, Clerical and Stock Depts.
ONE YEAR	Chemical Laboratory, Inspection, and Machine Tools Shop
ONE YEAR	Testing Dept., Production Dept. and Mechanical Dept.

### **Condit Electrical Manufacturing Co.**

ONE YEAR	Testing D. C. Apparatus
	Testing A. C. Apparatus
ONE YEAR	Switchboard
	Construction
	Installation
ONE YEAR	Blue Printing
	Drafting
ONE YEAR	Engineering
	Engineering Specifications

These schedules are arranged with the basic idea of giving the student a thorough training through the several different departments, but must of necessity be varied in accordance with the needs of those departments.

ABERTHAW CONSTRUCTION COMPANY, Boston (Civil)  
 ACME APPARATUS COMPANY, Cambridge (Electrical)  
 ALLEN, ALBION B., General Contractor, Amherst (Civil)  
 AMERICAN ACID COMPANY, Medford (Chemical)  
 AMERICAN AGRICULTURAL CHEMICAL COMPANY, Everett and Weymouth (Chemical)  
 AMERICAN GLUE COMPANY, Peabody (Electrical)

## SCHOOL OF ENGINEERING

AMERICAN RADIO AND RESEARCH CORPORATION, Medford Hillside (Electrical)  
AMERICAN STEAM GAUGE & VALVE COMPANY, Boston (Mechanical)  
APPLETON, THOMAS A., Civil Engineer, Salem (Civil)  
ARLINGTON FOUNDRY, Arlington (Chemical and Mechanical)  
ASPINWALL & LINCOLN, Civil Engineers, Boston (Civil)  
ATLANTIC SCREEN AND WOOD PRODUCTS COMPANY, Roxbury (Mechanical)  
BAKER, WALTER & COMPANY, LTD., Boston (Administrative)  
BARNES, ROWLAND H., Civil Engineer, Waltham (Civil)  
BATES, WALTER C., Surveyor, Jamaica Plain (Civil)  
BEACON OIL COMPANY, Everett (Chemical)  
BETHLEHEM SHIPBUILDING CORPORATION, Quincy (Civil, Mechanical, Electrical)  
BEVERLY GAS AND ELECTRIC COMPANY, Beverly (Electrical)  
BIRD AND SON, INC., East Walpole (Chemical)  
BLANCHARD MACHINE COMPANY, Cambridge (Mechanical)  
BOSTON & ALBANY RAILROAD, Boston (Civil)  
BOSTON BRASS COMPANY, Waltham (Mechanical)  
BOSTON FUEL TESTING COMPANY, Boston (Chemical)  
BOSTON INDIA RUBBER COMPANY, Boston (Chemical)  
BOSTON & MAINE RAILROAD, Boston (Mechanical and Civil)  
BOSTON SAND AND GRAVEL COMPANY, Boston (Mechanical and Electrical)  
BOSTON UNIVERSITY — Laboratory, Boston (Chemical)  
BOSTON VARNISH COMPANY, East Everett (Chemical)  
BOSTON WOVEN HOSE & RUBBER COMPANY, Cambridge (Mechanical and Chemical)  
BRACKETT, L. G., Civil Engineer, Boston (Civil)  
BUFF & BUFF MANUFACTURING COMPANY, Jamaica Plain (Civil and Mechanical)  
BROWN, BURTIS S., Consulting Engineer, Boston (Civil)  
BUTT, H. G., MANUFACTURING COMPANY, Boston (Mechanical)  
CAMBRIDGE RUBBER COMPANY, Cambridge (Electrical)  
CHASE-SHAWMUT COMPANY, Newburyport (Electrical)  
COFFIN VALVE COMPANY, Neponset (Mechanical)  
CONANT MACHINE COMPANY, Concord (Mechanical)  
CONDIT ELECTRICAL MANUFACTURING COMPANY, South Boston (Electrical)  
CORBETT, E. M., Civil Engineer and Architect, Fall River (Civil)  
CRITTENDEN MANUFACTURING COMPANY, Jamaica Plain (Mechanical)  
CROCKER, H. S., City Engineer, Brockton (Civil)  
CROSBY STEAM GAGE & VALVE COMPANY, Charlestown (Mechanical)  
DENNISON MANUFACTURING COMPANY, Framingham (Mechanical and Electrical)  
DRISCOLL & COMPANY, Heating Contractors, Salem (Mechanical)  
EASTERN METAL & REFINING COMPANY, Malden (Mechanical)  
EASTMAN AND BRADFORD, Civil Engineers, Lynn (Civil)  
EDISON ELECTRIC ILLUMINATING COMPANY OF BOSTON (Mechanical, Electrical, Chemical)  
EDISON ELECTRIC ILLUMINATING COMPANY OF BROCKTON (Mechanical)  
ELECTRICAL INSTALLATION COMPANY, Boston (Electrical)  
ELECTRIC MAINTENANCE COMPANY, Boston (Electrical)  
ELLIOT, C. J., Civil Engineer, Boston (Civil)

## CO-OPERATIVE PLAN

ELLIS MANUFACTURING COMPANY, Milldale, Conn. (Mechanical)  
EMERSON APPARATUS COMPANY, Melrose (Mechanical)  
EVANS, R., Essex County Engineer, Salem (Civil)  
FARNHAM, RALPH J., Civil Engineer, Wellesley (Civil)  
FELLOWS GEAR SHAPER COMPANY, Springfield, Vt. (Mechanical)  
FOUNDATION COMPANY, Inc., of New York, N. Y. (Civil)  
FULLER, GEORGE A., COMPANY, Boston (Civil)  
GANNETT, CHARLES H., Civil Engineer, Boston (Civil)  
GENERAL ELECTRIC COMPANY, Lynn (Mechanical, Electrical, Chemical)  
GENERAL ELECTRIC COMPANY, Pittsfield (Electrical)  
GENERAL RADIO COMPANY, Cambridge (Electrical)  
GLENLYON DYE WORKS, Saylesville, R. I. (Chemical)  
HAYWARD, R. LORING, Civil Engineering, Taunton (Civil)  
HEDLUND, CHARLES, COMPANY, Quincy (Electrical)  
HOLTZER CABOT ELECTRIC COMPANY, Roxbury (Electrical)  
HOLYOKE WATER POWER COMPANY, Holyoke (Electrical)  
HOOD RUBBER COMPANY, Watertown (Mechanical)  
HORTONIA LIGHT & POWER COMPANY, Rutland, Vt. (Electrical)  
HOWE & FRENCH, Boston (Chemical)  
HUME BODY CORPORATION, Boston (Mechanical)  
HUMPHREY, C. B., Court Surveyor, Boston (Civil)  
HUNT-SPILLER MANUFACTURING COMPANY, South Boston (Chemical)  
HYDE, DANIEL W., Civil Engineer, Boston (Civil)  
HYGRADE LAMP COMPANY, Salem (Electrical)  
INTERNATIONAL ENGINEERING WORKS, Framingham (Mechanical)  
INTERNATIONAL PAPER COMPANY, Franklin, N. H. (Electrical)  
JAGER, CHARLES J., COMPANY, Boston (Mechanical)  
JARVIS ENGINEERING COMPANY, South Boston (Mechanical)  
JOY, C. F., JR., Town Engineer, Milton (Civil)  
KENDALL, F. H., Middlesex County Engineer, Cambridge (Civil)  
KENNEY BROS. & WOLKINS, Boston (Mechanical)  
KINNEY MANUFACTURING COMPANY, Jamaica Plain (Mechanical)  
KNOTT, L. E., APPARATUS COMPANY, Cambridge (Mechanical and Chemical)  
LANDERS, FRARY & CLARKE, New Britain, Conn. (Mechanical)  
LAWTON MILLS CORPORATION, Plainfield, Conn. (Mechanical)  
LEVER BROTHERS, Soap Manufacturers, Cambridge (Chemical)  
LINDSAY, P. K., & COMPANY, Boston (Mechanical)  
LUND AND BRADLEY CONSTRUCTION COMPANY, Worcester (Civil)  
MAINE STATE HIGHWAYS, Augusta, Maine (Civil)  
MALDEN & MELROSE GAS & ELECTRIC COMPANY, Malden (Electrical and Chemical)  
MANHASSETT MANUFACTURING COMPANY, Putnam, Conn. (Electrical)  
MARTIN ROCKING FIFTH WHEEL COMPANY, Springfield (Mechanical)  
MASON REGULATOR COMPANY, Milton (Mechanical)  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge (Chemical)  
MASSACHUSETTS PUBLIC WORKS DEPT., Division of Highways, Boston (Civil)  
MASSACHUSETTS PUBLIC WORKS DEPT., Testing Laboratory, Boston (Chemical)  
MCCLINTOCK & WOODFALL, Civil Engineers, Boston (Civil)  
MCLEWAIN, W. H., COMPANY, Manchester, N. H. (Mechanical)  
MCINTIRE, F. N., BRASS WORKS, Boston (Mechanical)  
MERCHANT, A. P., COMPANY, Boston (Electrical)

## SCHOOL OF ENGINEERING

MERRIMAC CHEMICAL COMPANY, North Woburn (Chemical)  
METAL GOODS MANUFACTURING COMPANY, INC., Boston (Mechanical and Electrical)  
METROPOLITAN DISTRICT COMMISSION, Boston (Civil)  
MONKS AND JOHNSON, Structural Engineers, Boston (Civil)  
MORGAN CONSTRUCTION COMPANY, Worcester (Mechanical)  
MOSS ELECTRICAL COMPANY, Putnam, Conn. (Electrical)  
NEW ENGLAND COAL & COKE COMPANY, Everett (Chemical)  
NEW ENGLAND CONFECTIONERY COMPANY, Boston (Mechanical)  
NEW ENGLAND OIL REFINING COMPANY, Fall River (Civil)  
NEW ENGLAND SLATE BLACKBOARD COMPANY, Boston (Mechanical)  
NEW ENGLAND STRUCTURAL COMPANY, Everett (Mechanical)  
NEWTON CITY ENGINEER (Civil)  
NEW YORK, NEW HAVEN & HARTFORD R. R. (Norwood Shops) (Electrical)  
NORFOLK IRON WORKS, Quincy (Mechanical)  
NORTHEASTERN UNIVERSITY—Laboratories (Civil, Mechanical, Electrical, Chemical)  
NORTON COMPANY, Worcester (Mechanical)  
NORWOOD TOWN ENGINEER (Civil)  
OXFORD PAPER COMPANY, Rumford, Maine (Mechanical)  
PAVER'S MACHINE SHOP, Franklin (Mechanical)  
PLYMOUTH CORDAGE COMPANY, Plymouth (Mechanical)  
PLYMOUTH ELECTRIC LIGHT COMPANY, Plymouth (Electrical)  
PLYMOUTH TOWN ENGINEER (Civil)  
PNEUMATIC SCALE CORPORATION, Norfolk Downs (Mechanical)  
POTTER, HERBERT S., Electrical Contractor, Boston (Electrical)  
PORTLAND, MAINE, DEPARTMENT OF PUBLIC WORKS (Civil)  
PUNCHARD, W. H., Landscape Architect, Boston (Civil)  
PUTNAM MACHINE COMPANY, Fitchburg (Mechanical)  
SACO-LOWELL SHOPS, Newton Upper Falls (Electrical)  
SAMSON ELECTRIC COMPANY, Canton (Electrical)  
SANBORN COMPANY, Instrument Manufacturers, Boston (Mechanical and Electrical)  
SHARPLES LABORATORY, Boston, (Chemical)  
SIMPLEX ELECTRIC HEATING COMPANY, Cambridge (Electrical)  
SIMPLEX WIRE AND CABLE COMPANY, Cambridge (Electrical)  
SIMPSON BROTHERS CORPORATION, Boston (Civil)  
SKINNER ORGAN COMPANY, Dorchester (Mechanical)  
SKINNER, SHERMAN & ESSELEN, INC., Boston (Chemical)  
SPENCER-THERMOSTAT COMPANY, Cambridge (Mechanical)  
STARRET, L. S., TOOL COMPANY, Athol (Mechanical)  
STEVENS DURYEA COMPANY, Chicopee Falls (Mechanical and Electrical)  
STURTEVANT, B. F., COMPANY, Hyde Park (Mechanical and Electrical)  
TAYFORD COMPANY, THE, Lee, Mass. (Electrical)  
THOMSON, HENRY C., Patent Attorney, Boston (Mechanical)  
TRIMOUNT MANUFACTURING COMPANY, Roxbury (Mechanical)  
TRUFANT, A. P., Civil Engineer, Brockton (Civil)  
TUFTS, NATHANIEL, METER WORKS, Boston (Mechanical)  
TURNER CONSTRUCTION COMPANY, Boston (Civil)  
UNION SPINNING & PLATING COMPANY, Boston (Mechanical)  
UNITED ELECTRIC RAILWAYS COMPANY, Providence, R. I. (Civil, Mechanical, Electrical)  
UNITED SHOE MACHINERY COMPANY, Beverly (Mechanical and Electrical)

## CO-OPERATIVE PLAN

UNITED STATES ENVELOPE COMPANY, Holyoke (Mechanical)  
UNIVERSAL HOIST & BODY COMPANY, Everett (Mechanical)  
VAN VALKENBURGH, J. J., Civil Engineer, Framingham (Civil)  
VARNEY, HENRY A., Town Engineer, Brookline (Civil)  
VENNARD, WILLIAM L., City Engineer, Lynn (Civil)  
VICTOR SHOE MACHINERY COMPANY, Lynn (Mechanical)  
VISCOLOID COMPANY, Leominster (Mechanical)  
WALTHAM MOTOR MANUFACTURERS, INC., Waltham (Mechanical)  
WALTHAM WATCH COMPANY, Waltham (Mechanical and Chemical)  
WARREN BROTHERS COMPANY, Paving Materials Laboratory, Cambridge  
(Chemical)  
WERBY LABORATORIES, Boston (Chemical)  
WESTINGHOUSE ELECTRIC MANUFACTURING COMPANY, Springfield (Elec-  
trical)  
WEYMOUTH LIGHT & POWER COMPANY, Weymouth (Electrical)  
WHIDDEN BEEKMAN COMPANY, Boston (Civil)  
WHITMAN AND HOWARD, Civil Engineers, Boston (Civil)  
WHITNEY, CHARLES F., Civil Engineer, Boston (Civil)  
WICKWIRE SPENCER STEEL CORPORATION, Palmer (Mechanical)  
WILLARD SERVICE STATION, South Framingham (Electrical)  
WOBURN MACHINE COMPANY, Woburn (Mechanical)  
WOLLASTON FOUNDRY COMPANY, Norfolk Downs (Mechanical)  
WORCESTER ELECTRIC LIGHT COMPANY, Worcester (Mechanical and  
Electrical)

## **SCHOOL OF ENGINEERING**

### **FULL-TIME PLAN**

#### **FOR SOPHOMORES AND JUNIORS**

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Students of the sophomore and junior classes except option 2 of curriculums I and II may elect, if they so desire, the full-time plan. On this plan, the students attend school three additional periods of five weeks each year. During each term which is a unit in itself, subjects such as Literature, Economics, Accounting, Industrial Organization, and Business Administration are given. For more detailed information, see page 80.

Students electing this plan are assigned to Division "AA" or "BB." Division AA men enter the school with Division A men and take exactly the same work as is offered to the co-operative men for the first five-week period. At the end of that time, when the Division A men resume co-operative work, the AA men remain in school taking the first term work of the liberal subjects. At the end of this five-week period, they return to the subjects of the engineering curriculum. This process is repeated each ten weeks until the students have had a total of four co-operative plan periods and three full-time plan terms. The Division AA men, therefore, complete their course of study for the year at the same time as the Division A men.

Division BB men enter with the Division B men taking their co-operative plan subjects together for four alternate five-week periods. In the three intervening five-week terms, the BB men devote their time to the liberal subjects.

### **Engineers with Administrative Training Needed**

At the present time, there is a great and growing demand for engineers with a knowledge of accounting, system building, and management, to act as executive officers, managers, superintendents and efficiency engineers in our industrial plants, transportation systems, and public utilities. Although many attractive positions are open to men qualified for this work, the demand far exceeds the supply.

In order to meet the need, the faculty of the School of Engineering has deemed it advisable to extend the work of the uni-

## **FULL-TIME PLAN**

versity and has planned a regular full-time plan so that a student may attend school full time for thirty-five consecutive weeks beginning in September or October, in either or both his sophomore and junior years, complete all of the prescribed engineering curriculum for his department and fifteen weeks of study in administrative and liberal arts subjects each year. This will provide a training for men who desire to enter positions which demand a knowledge of business, scientific and engineering principles. It combines the instruction in engineering subjects with the study of accounting, law, and methods of business, adding certain liberal subjects without which an education is incomplete.

The courses are planned to train students to analyze commercial, industrial, and employment problems. Special emphasis is placed upon system building, scientific management, and labor problems, industrial organization and business management. The courses are not designed to produce auditors and accountants but rather to be of service to administrative officers in analyzing accounts and financial reports.

### **Options in Sophomore and Junior Years**

A student entering the School of Engineering is given, during his sophomore and junior years, his choice of two plans: (1) the present Co-operative Plan, or (2) the Full-time Plan.

Men electing the Administrative Option in curriculums I and II, however, are not eligible to elect the Full-time Plan.

### **Full-Time Plan**

The Full-time student, during his sophomore and junior years, will attend school for thirty-five consecutive weeks beginning in September or October, complete all of the prescribed engineering curriculum for his department and fifteen weeks of study in administrative and liberal arts subjects each year. He will cover all the courses in the engineering curriculum with either Division A or B and in the five-week periods between the engineering periods while the co-operative student is at work, the full-time student will take the courses of administrative

## SCHOOL OF ENGINEERING

and cultural value. Each year there will be three terms of five weeks each devoted to such work.

Sophomores and juniors in Division A who elect the Full-time Plan will return to school September 10 and will complete their work May 12. Sophomores and juniors in Division B will return to school October 15 and will complete their work June 14.

During the summer of seventeen weeks following the sophomore and junior years, the student on the Full-time Plan will be free to work if he desires.

All students, Co-operative as well as Full-time, are required to work with co-operative firms during the senior year beginning with the opening of the school year in September.

### **Training in Administrative Subjects**

Each student, electing the Full-time Plan, will be given a thorough training in the theory of business management, business law, accounting, marketing, etc. The student electing this plan will receive his degree in one of the four recognized branches of engineering, assuring him the mastery of his professional field. In addition, he will have had instruction in the problems which confront the executive in business, and thus will be equipped to assume responsibilities of an administrative nature.

### **Broader Liberal Education**

A common criticism that the engineer is made narrow by the strictness of his confinement to technical subjects during his college course does not apply to the full-time man, for, in addition to his professional subjects, he is given an opportunity to study such subjects as literature, psychology, sociology, etc.

### **Opportunity for Work**

The student on the Full-time Plan is free for seventeen weeks each year, from May to September, or from June to October. This provides an excellent opportunity for him to engage in remunerative employment if he so desires.

## **FULL-TIME PLAN**

### **Engineering Practice**

Believing that actual experience with the co-operating firms is invaluable to the graduates of the School of Engineering, the full-time man as well as the man on the Co-operative Plan is required to spend his senior year at Engineering Practice during the alternate periods between his periods of study in the engineering curriculum.

### **Tuition**

The tuition for students electing the Full-time Plan is Two hundred twenty-five Dollars (\$225). (See Page 54.)

### **Time for Selecting Option**

Each student must definitely decide whether he intends to attend the Engineering School the subsequent year under the Co-operative or Full-time Plan on or before June 1st each year.

### **Transfers**

A student pursuing the Co-operative or Full-time Plan will be allowed to change from one to the other at the beginning of the year only, except for such men as may be required by the school authorities to pursue one or the other of the plans.

### **Relation of School to High Schools**

This School is peculiarly adapted to the high school graduate with limited financial resources who still has the ambition and ability to get ahead if given the opportunity.

This year the school has a student body made up of graduates of the following schools:

Abington High School  
Adams High School  
Amherst High School  
Amesbury High School  
Andover Academy  
Annapolis Royal Academy  
(Granville Ferry, Nova Scotia)  
Anson (Me.) Academy

Ansonia (Conn.) High School  
Aphaloma (Greece) High School  
Arlington High School  
Aroostook Central Institute  
Ashbry High School  
Ashland High School  
Athol High School  
Attleboro High School

## SCHOOL OF ENGINEERING

Ayer High School	Dixfield (Me.) High School
Bangor (Me.) High School	Dorchester High School
Bar Harbor (Me.) High School	Drury High School
Barnstable High School	(North Adams)
Bartlett High School (Webster)	Dummer Academy (South By-
Barton (Vt.) High School	field)
Belchertown High School	Durfee High School (Fall River)
Berkeley Preparatory School	Duxbury High School
Berwick (Me.) Academy	East Bridgewater High School
Beverly High School	East Maine Conference Seminary
Bolton (England) Technical	(Bucksport, Me.)
School	East Towers (Mich.) High School
Boothbay Harbor (Me.) High	Eastport (Me.) High School
School	Emerson (N. J.) High School
Boston College High School	Essex County Agricultural School
Boston English High School	Everett High School
Boston Latin High School	Exeter (N. H.) High School
Boston Trade School	Fairhaven High School
Boston High School of Commerce	Fishburne (Va.) Academy
Bourne High School	Fitchburg High School
Braintree High School	Flushing (N. Y.) High School
Brandon (Vt.) High School	Fort Valley (Ga.) High School
Brewster Free Academy	Foxboro High School
(Wolfeboro, N. H.)	Framingham High School
Bridgewater High School	Franklin (Mass.) High School
Brighton High School	Franklin (N. H.) High School
Bristol (Conn.) High School	Freeport (Me.) High School
Brockton High School	Gardner High School
Brookline High School	General Electric Training School
Bulkeley High School	Gloucester High School
(New London, Conn.)	Goddard (Vt.) Seminary
Brunswick (Me.) High School	Good Will (N. Y.) High School
Burlington (Vt.) High School	Groveton (N. H.) High School
Cambridge High and Latin School	Hale High School
Camden (Me.) High School	Hallowell (Me.) High School
Canaan (Vt.) High School	Hamilton High School
Candia (Greece) High School	Hanover High School
Canton High School	Hartford (Conn.) High School
Chelsea High School	Hebron (Me.) Academy
Clinton High School	Hingham High School
Cohasset High School	Holden High School
Colby (N. H.) Academy	Holyoke High School
Conant (N. H.) High School	Hudson High School
Concord (Mass.) High School	Huntington School
Concord (N. H.) High School	Hyde Park High School
Cony High School (Augusta, Me.)	Ilford (England) High School
Cranston (R. I.) High School	Island Falls (Me.) High School
Danvers High School	Island Pond (Vt.) High School
Dean Academy (Franklin)	Ithaca (N. Y.) High School
Dedham High School	Johnson (Vt.) High School
Deep River (Conn.) High School	Keene (N. H.) High School
Deering High School	Kennebunk (Me.) High School
(Portland, Me.)	Kimball Union Academy
Dexter (Me.) High School	(Meriden, N. H.)

## RELATION TO HIGH SCHOOLS

Kingston High School	North Berwick (Me.) High School
Laconia (N. H.) High School	Northbridge High School
Lancaster High School	Northampton High School
Lawrence High School	Northeastern Secondary School
Lee High School	North Yarmouth (Me.) Academy
Leicester High School	Norton High School
Leominster High School	Norwalk High School
Lewis (Conn.) High School	Norwell High School
Lexington High School	Norwood High School
Lincoln (N. H.) High School	Nute High School (Milton, N. H.)
Lowell High School	Orange High School
Lubec (Me.) High School	Osceola (Fla.) High School
Lynn Classical High School	Oswego (N. Y.) High School
Lynn English High School	Parsonfield (Me.) Seminary
Madison (Me.) High School	Pawtucket High School
Malden High School	Peabody High School
Manchester (N. H.) High School	Pittsfield High School
Manlius (N. Y.) High School	Plainfield (Conn.) High School
Mansfield High School	Plainville High School
Marash (Armenia) High School	Plymouth High School
Marblehead High School	Portland (Me.) High School
Marlboro High School	Portsmouth (N. H.) High School
Marshfield High School	Pratt (Conn.) High School
Maynard High School	Proctor (Vt.) High School
Mechanic Arts High School	Provincetown High School
Medfield High School	Putnam (Conn.) High School
Medford High School	Quincy High School
Medway High School	Reading High School
Melrose High School	Redondo Beach (Cal.) High School
Meredith (N. H.) High School	Revere High School
Meriden (Conn.) High School	Richford (Vt.) High School
Mexico (Me.) High School	Rindge Technical High School
Middlebury (Vt.) High School	Rockland High School
Middletown (Conn.) High School	Salem High School
Milford High School	Sanasarian College (Turkey)
Millbury High School	Sanderson Academy (Ashfield)
Milton High School	Saugus High School
Monson Academy	Scarboro (Me.) High School
Montpelier (Vt.) Seminary	Schuylerville (N. Y.) High School
Morse (Me.) High School	Scituate High School
Murdock High School	Sharon High School
Mt. Hermon School (Northfield)	Shrewsbury High School
Nantucket High School	Skowhegan (Me.) High School
Nashua (N. H.) High School	Somerset High School
Natick High School	Somersworth (N. H.) High School
Needham High School	Somerville High School
New Bedford High School	South Boston High School
New Britain (Conn.) High School	South Hadley (Me.) High School
New London (Conn.) High School	Springfield Technical High School
Newburyport High School	Springfield Central High School
Newton High School	Springfield (Vt.) High School
Newton Vocational School	Stephens (Me.) High School
Newport (N. H.) High School	Stevens (N. H.) High School
North Attleboro High School	St. Anselem High School

## SCHOOL OF ENGINEERING

St. Johnsbury (Vt.) High School	Wentworth Institute
Stowe (Conn.) High School	West Boylston High School
Strong (Me.) High School	West Hartford (Conn.) High School
Sutton High School	West Roxbury High School
Swampscott High School	Westbrook (Me.) Seminary
Taunton High School	Westfield High School
Templeton High School	Westinghouse High School
Thayer Academy	(Pittsburgh, Pa.)
(South Braintree)	Weymouth High School
Tilton (N. H.) Seminary	Whitman High School
Torrington (Conn.) High School	Winchester High School
Tourtellotte High School	Windham (Conn.) High School
(Thompson, Conn.)	Windsor (Vt.) High School
Townsend High School	Winthrop High School
Upton High School	Woburn High School
Vassar (Mich.) High School	Woodstock (Conn.) Academy
Vergennes (Vt.) High School	Worcester Classical High School
Vinalhaven (Me.) High School	Worcester Commercial High School
Wakefield High School	Worcester South High School
Walpole High School	Worcester Trade School
Waltham High School	Wrentham High School
Wareham High School	Yarmouth (Me.) High School
Washington (Conn.) High School	York (Me.) High School
Watertown High School	
Wayland High School	
Wellesley High School	

## **EQUIPMENT OF THE SCHOOL**

### **ENGINEERING EQUIPMENT**

#### **Field Instruments of Civil Engineering**

For work in the field, the Civil Engineering Department possesses various surveying instruments, representing the principal makes and types in general use. The equipment includes two Keuffel & Esser transits, five Buff & Buff transits, one Buff & Buff triangulation transit, two Hutchinson transits, one Pool transit, two Berger levels, three other levels, and five plane table outfits. There are Locke hand levels, flag poles, leveling rods, stadia rods, engineers' and surveyors' chains, steel and cloth tapes, and all the miscellaneous equipment necessary to outfit the parties that the instruments will accommodate. The transits are equipped with neutral glasses and reflectors for astronomical observations. For higher surveying there is an aneroid barometer for barometric leveling, a sextant for hydrographic surveying, and a Gurley electric current meter for hydraulic measurements.

The extent of the equipment and scope of the field work itself are designed to train the student's judgment as to the relative merits of the various types of field instruments.

#### **Mechanical Laboratories**

The steam power plant is equipped with a flow meter in the feed water line, steam pressure gages, scales, electrical meters, thermometers, indicators, Orsat apparatus, CO<sub>2</sub> recorder and other equipment necessary for complete power plant tests. The plant consists of four horizontal-return tubular boilers, two of which are equipped for burning fuel oil and two for burning coal; various auxiliary appliances as feed-water pumps, feed-water heater, oil fuel pumps, and separators; and four three-wire generators, three of which are driven by Ridgeway reciprocating steam engines of various sizes, and the fourth is direct connected to a Westinghouse Parsons turbine. In addition, a Chicago steam-driven air compressor is completely equipped for making tests both on the steam and air end of the machine, and a Sturtevant air blower is arranged to run tests on.

## SCHOOL OF ENGINEERING

Besides the steam-driven apparatus, there is a Gas Laboratory consisting of a Fairbanks-Morse 10-horsepower oil engine so set up that tests may be run using various kinds of fuels and complete test data obtained, a Ford automobile engine arranged to run tests with different fuels and carburetors, and a gasoline airplane engine for demonstration purposes.

This places at the disposal of the students well-equipped, up-to-date engineering laboratories and enables them to carry on boiler tests, with both coal and oil as fuel—determine the efficiencies of various fuels—take indicator cards—determine the efficiency of modern reciprocating steam engines and turbines when direct connected to generators and test air compressors, fans, and gas engines. This renders the student familiar with the various auxiliary appliances of a modern power plant. Apparatus is also available for slide valve setting, gage testing, measuring flow of air, steam, and water, Prony brake testing, and determining the quality of steam by means of a throttling calorimeter.

### Electrical Measurements Laboratory

This laboratory was entirely rebuilt during the summer of 1920, being doubled in floor space and otherwise improved.

It is equipped with apparatus of two distinct types; first that planned fundamentally for teaching the principles of measurement and, second, that which is used in teaching advanced standardizing measurement as well as in keeping the instruments in daily use in the other laboratories, as well as in the power house, correct or properly calibrated.

It is supplied with two sets of small storage cells for 500-volt calibration work and a set of 500-ampere-hour cells for current work.

The apparatus used in the first portion of the work includes the customary devices used in such work as resistance measurements by Ohm's law, direct deflection and substitution methods, voltmeter methods for high resistance, insulation resistance, specific resistance, use of slide wire and Wheatstone bridges, electrostatic capacity, Poggendorf's method of E. M. F. comparison, loop tests for grounds, etc.

## EQUIPMENT OF THE SCHOOL

For the second class of tests there are a laboratory standard Wheatstone bridge, Kelvin bridge, fittings for using the Carey-Foster method, two Leeds Northrup potentiometers (a high and low resistance one) with auxiliary apparatus as volt boxes, certified standard cells, standard shunts, standard current transformers, Weston Laboratory standard A. C. voltmeter of triple range, ammeter (also of triple range) wattmeter, and all necessary reflecting galvanometers carried on Julius suspensions.

The instrument room is supplied with 48 high grade General Electric Co. and Weston Electric Instrument Co. alternating current voltmeters and ammeters with a number of potential and current transformers, and with 5 polyphase and nine single-phase indicating wattmeters each of double current and double voltage ranges.

For direct current working there are 41 voltmeters (of triple range) ammeters and millivoltmeters of the above makes. There are 24 standard shunts of ranges from 10 to 100 amperes with uniform drops of 50 millivolts to go with the millivoltmeters.

There is also a large and varied assortment of auxiliary equipment such as sliding rheostats for circuit control, loading resistances, frequency indicators, power factor indicators, etc.

### Electrical Engineering Laboratory

This Laboratory also was entirely remodeled during the summer of 1922. Its floor area was increased by 60 per cent, and the apparatus re-arranged as well as augmented along various lines.

It is equipped with 32 generators and motors of different types, the size and voltage ratings being selected to reduce as much as possible the risk from high voltage apparatus while making available to the student commercial apparatus such that the various quantities it is desired to measure will be of reasonable dimensions.

Machines from 5 to 25 kilowatt capacity are used principally for this reason, but also because the student in his Engineering

## SCHOOL OF ENGINEERING

Practice early comes in contact with large and varied machinery in power houses and electrical plants generally.

For D. C. working, among others there are two sets of specially matched direct current 6-kilowatt, 125-volt compound generators, which will still work as shunt machines. One set is driven by a large Sprague motor with double extended shaft, the two generators being tied together by a coupling so that they may be used for "pump-back" testing. The other pair are driven individually by 10-kilowatt, 230-volt motors and used principally for parallel operation and similar work. A large 230-volt, 12-kw, 200 R. P. M. Sturtevant motor is used for retardation tests, and an assortment of series, shunt and compound motors each fitted with brake wheels are used for routine motor testing.

For A. C. working there is a 15-kw. (80 per cent p. f.) 3-phase 230-volt alternator driven at 60 cycles by a 25 HP Westinghouse motor, a 7.5 kw. special G. E. machine with special armature taps so that it may be used as single phase, two phase, three or six-phase synchronous motor.

Two 12-kw. (80 per cent p. f.) G. E. machines having each armature coil tapped out separately also giving the above phase arrangements, each driven by its own motor and available for use either as synchronous generators or as motors. A 5 kw. Holtzer Cabot machine with three rotors, making it available as either a squirrel cage, wound rotor, or synchronous machine. A G. E. single phase clutch motor, a type R. I. induction motor, a Wagner single phase motor; two Wagner motors arranged for concatenation control, and two 5-kw. Holtzer three-phase synchronous converters.

For transformers there are six single-phase G. E. type H units wound for 550 volts primary and 220/110 volts secondary. Two sets of transformers with Scott transformation taps, and a Type R. O. constant current transformer primary winding for 220/190 volts and secondary for 6.6 amperes, 310 volts maximum, fitted with a load of 80 candle power 6.6-amperes 60-watt nitrogen filled tungsten lamps.

There is also a full equipment of necessary control and regulating appliances and fourteen movable test tables fitted with

## EQUIPMENT OF THE SCHOOL

the necessary terminals, switches, circuit breakers, etc., for setting up the various test combinations required from time to time. Each student when performing an experiment does the complete wiring, no apparatus in the Laboratory being found permanently wired up except as to its normal, self-contained circuits.

Power is supplied from one or two special units in the power house, which, when on the Laboratory mains, are cut clear from any other service whatever.

### Chemical Laboratories

The laboratories are arranged in three units, one for each of the general branches of chemistry; *i. e.*, inorganic, analytical and organic. To meet the requirements of the inorganic work, the equipment has been very carefully and completely selected. The laboratory for analytical work is well supplied with the usual routine apparatus required, and also apparatus for special work. Connecting with this laboratory is a modernly equipped balance room.

This special equipment includes a Freas electric drying oven, a Kimley electro-analysis apparatus, an Emerson bomb calorimeter, an Orsat apparatus for gas analysis, a Saybolt viscosimeter, New York State flash point tester, a Babcock milk tester, a Hoskins electric combustion furnace and a Shriver type filter press.

The laboratory for organic work is especially equipped with steam lines for distillation purposes, besides the usual steam baths, drying closets, compressed air lines and hoods. The common chemicals, including acids, bases and salts, are available in the laboratories for general use at all times. At the end of one of the laboratories, conveniently located, is a fully equipped stock room, from which any other chemical or apparatus can be readily obtained.

## SCHOOL OF ENGINEERING

### Design and Drafting Rooms

The School possesses large, light, and well-equipped drawing rooms for the carrying on of the designing and drafting which form so important a part of engineering work. These rooms are supplied with lockers containing the drawing supplies, and files containing blue prints, and photographs of machines and structures that represent the best practice.

### Physics Laboratories

The Physics Department has two large laboratories completely equipped with all necessary apparatus for the experimental work that is required of the students, as well as that required for lecture demonstration. The apparatus and equipment includes verniers, levels, vacuum pump, spirometer, planimeters, spherometers, calorimeters, thermometers, pyrometer, sonometer, spectroscope, spectrometer, balances, standard gram weight, lecture table galvanometer, optical disk with all accessories, lenses, photometer, air thermometer, and a full set of weather bureau apparatus, including barograph, thermograph, hygrometer, barometer, maximum and minimum thermometers, etc. These give a wide range to the experimental work that can be done.

### Libraries

Students of the School have available for their use the general library of the Association, which includes, for their exclusive use, a large collection of engineering texts, reference books, and current periodicals on engineering and scientific subjects.

In addition, all members of the School have the privilege of taking books from the Boston Public Library, which offers a very unusual opportunity to our non-resident students. The School is within easy access to the Public Library, which enables students to have unlimited reference to engineering subjects at any time.

## EQUIPMENT OF THE SCHOOL

### Department of Physical Training

Northeastern has exceptional facilities for all-round physical training. The gymnasium with its 12-lap running track, three basketball courts, wrestling, boxing, fencing and special exercise rooms, handball courts and bowling alleys, is one of the most complete in New England. The natatorium is one of the best in the country. It is in a separate building, having a glass roof, admitting abundant sunlight, and has a continuous supply of filtered salt water. The tank is 75 feet long and 25 feet wide. Adjoining the building is a large field equipped for athletics. Here are four tennis courts, outdoor gymnasium, basketball court, jumping pits and a track with a 100-yard straight-away; baseball and football fields. Interclass contests are arranged in basketball, baseball, tennis, indoor and outdoor athletics, and swimming. Intercollegiate games and meets are arranged with the leading colleges in the East.

## REQUIREMENTS FOR ADMISSION

### REQUIREMENTS FOR ADMISSION

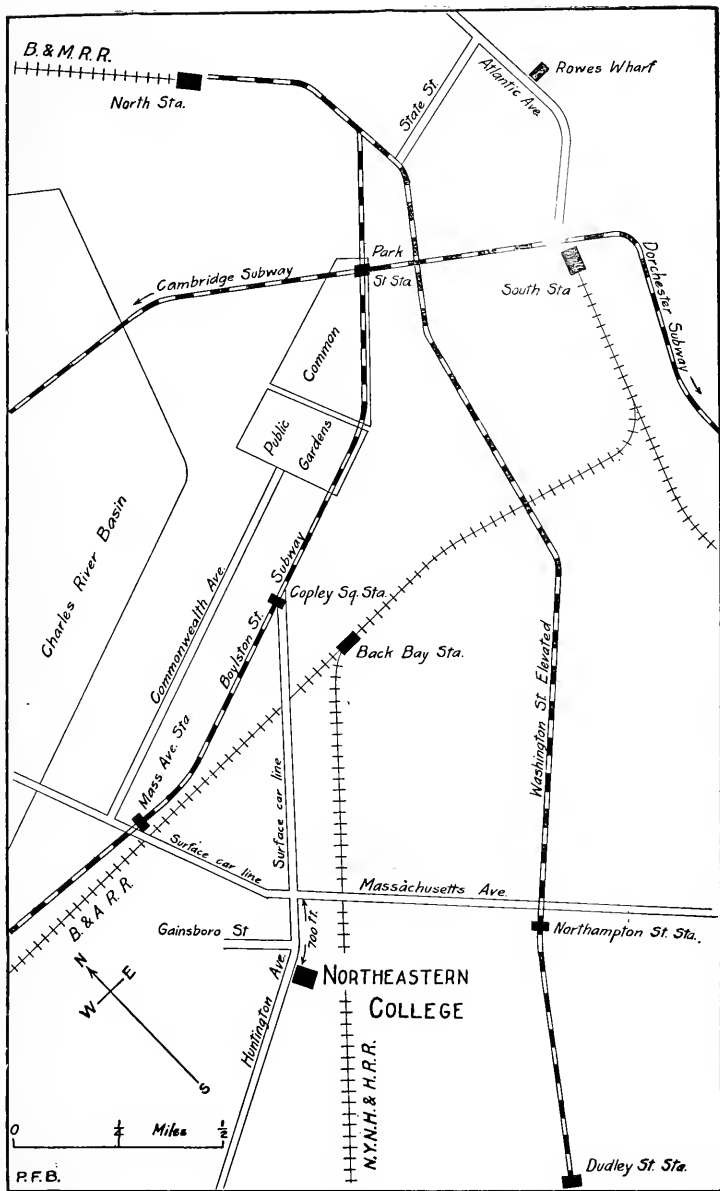
#### General Statement

In general, the preparation necessary to enable an applicant to pursue successfully one of the regular curriculums in the School corresponds to the four-year course of study offered by high schools of the better grade. The requirements of age and scholarship are regarded as the minimum in all ordinary cases, and only exceptional circumstances will justify any relaxation. Parents and guardians are advised that it is generally for the ultimate advantage of the student not to enter under the age of sixteen years. Every applicant must furnish references as to his character and ability, and must show cause why he may reasonably be expected to make a success of his course, both in the School and in Engineering Practice. He must be willing and able to work hard, both mentally and physically.

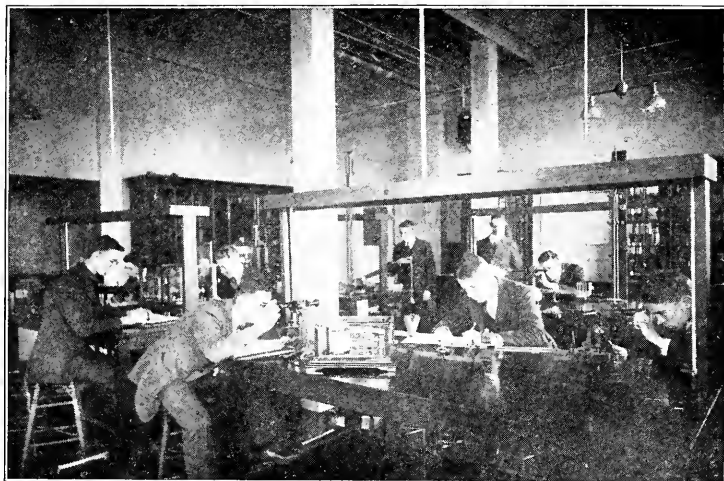
Students who have not completed a course in Physics in high school are required to take an extra subject during their freshman year.

#### Admission to the First Year

Students are admitted to the first year in all curriculums at the opening of the school year in September and at mid-year. The applicant to be accepted as a regular student and as a candidate for the degree must present evidence of graduation from an accredited high school or the equivalent, and to have included in his course of study five (5) Required Units and ten (10) of the Elective List of Units. A unit is the value attached to a high school subject studied for one year, four or five periods a week of forty or forty-five minutes' duration. Credit in units is never allowed on certificates of tutors. Certificates of entrance examinations passed for admission to other colleges and technical schools may be accepted in lieu of entrance examinations. The Committee on Admission reserves the right to require any candidate to present himself for examination in any subject which he offers for entrance and for



## Students in Class Work



Class in Physics Laboratory  
Northeastern University



Class in Mechanical Drawing  
Northeastern University

## SCHOOL OF ENGINEERING

which the Committee on Admission is unable to allow unit value. Credits offered for admission to the freshman class may not again be used as credits in the college course. A student who enters upon a certificate and later shows a marked deficiency in his entrance qualifications may be required to take entrance examinations or may be reconditioned.

Entrance conditions may be permitted to the extent of two units only, a minimum of thirteen units being required for conditioned admission to the freshman class. Conditions must be removed previous to taking up junior work.

### Specific Requirements for Admission:

The applicant must offer all of the Required Subjects as listed below:

<i>Required Subjects</i>	
English	3 Units
Algebra	1 Unit
Geometry	1 Unit
<hr style="width: 10%; margin: 5px auto;"/>	
Total	5 Units

He must offer from the Elective List of subjects a minimum of ten units:

<i>Elective Subjects</i>			
Trigonometry	$\frac{1}{2}$ Unit	Greek	1 to 4 Units
Civics	$\frac{1}{2}$ "	French	1 " 3 "
Physics	1 "	German	1 " 3 "
Chemistry	1 "	Spanish	1 " 3 "
Zoology	1 "	Ancient History	1 Unit
Physical Geography	1 "	Medieval & Modern	
Astronomy	$\frac{1}{2}$ "	History	1 "
Mechanical Drawing	$\frac{1}{2}$ " per yr.	English History	1 "
Manual Training	$\frac{1}{2}$ " " "	American History	1 "
Physiology	1 " " "	Solid Geometry	$\frac{1}{2}$ "
General Science	1 " " "	Higher Algebra	$\frac{1}{2}$ "
Bookkeeping	$\frac{1}{2}$ " " "	Biology	1 "
Latin	1 to 4 Units	Botany	1 "

The school recognizes the fact that other subjects are credited toward graduation by secondary schools. It will, therefore, accept as a part of the ten units in the elective group certificates for work in such subjects.

## SCHOOL OF ENGINEERING

In exceptional cases a student who is not a high school graduate may be allowed to enter as a special student, but only after his case has been passed on favorably by the Committee on Admission.

### **Application for Admission**

Each applicant for admission to the School is required to fill out an application blank, whereon he states his previous education, as well as the names of persons to whom reference may be made in regard to his character and previous training.

An application fee of five dollars (\$5) is required when the application is filed. This fee is non-returnable if the applicant is accepted. If he is rejected, one-half the fee will be returned upon request.

The last page of this catalog is in the form of an application blank. It should be filled out in ink and forwarded with the required five dollar fee to Carl S. Ell, Dean, 316 Huntington Avenue, Boston, Mass.

Upon receipt of the application, properly filled out, the School at once looks up the applicant's references and high school records. When replies have been received to the various inquiries instituted, the applicant is at once advised as to his eligibility for admission to the School.

### **First Tuition Payment**

Should a student wish to be assigned to a position with a co-operating firm before the regular opening of School, he is required to fill out a registration card and also an application for membership in the Boston Y. M. C. A. A payment of thirty dollars (\$30) on tuition must be paid before he will be assigned to any position at Engineering Practice.

Before any student shall be allowed to attend classes, he shall have made the first tuition payment. This is in addition to the application fee of five dollars (\$5) and all other fees, and may be paid at any time before school opens.

## GENERAL INFORMATION

### Subjects for Examination

Applicants who have not passed algebra to quadratics and plane geometry satisfactorily in their courses of study in high school are required to pass entrance examinations in these subjects.

By writing the School, prospective applicants may receive copies of former entrance examinations. These copies are available for distribution and may be obtained at any time.

Applicants who do not present a unit in Physics for admission are required to take an extra subject during the freshman year.

### Entrance Examinations in Boston

Examinations for admission to the first year class will be held at 316 Huntington Avenue in January, June and September of each year.

Students are advised to attend the January or June examinations, if possible, in order that any deficiencies then existing may be made up in September.

The time of examinations is as follows:

10. a. m. to 12 m., Algebra:

1:00 p. m. to 3:00 p. m., Plane Geometry.

During the current year the examinations will be given on the following days: January 18, 1923; June 14, 1923; Sept. 6, 1923.

All other examinations by special assignment.

No fees are to be paid at the time of the examination.

### Preparatory Schools

There are day and evening preparatory schools conducted by Northeastern. Students having entrance conditions, or re-

## SCHOOL OF ENGINEERING

quiring further preparation for the entrance examinations, may avail themselves of this opportunity to cover the desired work.

### Provisional Acceptance

When, for any reason it is deemed advisable, the School reserves the right to place any entering student upon a period of probation, extending from five to twenty weeks. Whether he shall be removed from probation at the end of this time or requested to withdraw will be determined by the character of the work that he has accomplished and his conduct during this probationary period.

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## SCHOOL INFORMATION IN DETAIL

### Location

The School is housed in the buildings of the Association, and in addition occupies the entire third floor of the Gainsborough Building, directly opposite.

The buildings are located on Huntington Avenue, just beyond Massachusetts Avenue, and are within easy access to the various railroad stations, and the business and residential sections. A map is shown opposite page 48.

### Residence

It has been found to be much more satisfactory for the student to live within easy access of Boston, especially during periods in school, than to live out twenty-five or thirty miles. The saving of time and effort more than offsets any increased expense.

There are limited accommodations at very moderate rates in the dormitories. These rooms may be had separately or in groups with a common reception room. The price varies from \$3.00 per week upwards. Since board costs about \$8.00 to \$10.00 per week, a student may obtain room and board for from \$12.00 per week upwards.

## GENERAL INFORMATION

Residence in Boston, though not required, is advisable as it gives the student opportunity to use the college facilities outside of class hours, and to confer easily with his instructors about his college work. It also gives him a wider range in the choice of a co-operating position, since he can readily report for early work if necessary, which is often impossible if the student lives at a distance from Boston. Moreover, residence in Boston gives the student close connection with the activities of college life.

The School officials have no jurisdiction in the matter of dormitory assignments. Students should write the General Activities Department of the Boston Y. M. C. A. for rooms in the dormitories.

The General Activities Department of the Y. M. C. A. maintains a registry of suitable rooms in the nearby houses for the convenience of students desiring accommodations outside of the dormitories.

### School Year

The First Semester for Division A begins each year on the second Monday in September, this constituting the beginning of the school year for all students. The second Summer Term for freshmen follows the vacation period and closes the official school year.

### Attendance

Students are expected to attend all exercises in the subjects they are studying unless excused by the Registrar. Students who are absent from the first school exercise after a holiday or recess period are required to pay a fine of two dollars (\$2.00). Exercises are held, and students are in general expected to devote themselves to the work of the School, between 9:00 a. m. and 5:00 p. m., with a one-hour lunch period, on every week day except Saturday. Saturday classes are held only between 9:00 a.m. and 1:00 p. m.

## SCHOOL OF ENGINEERING

### Four-Year Curriculums

The School offers four-year college curriculums of study, in co-operation with engineering firms, in the following branches of engineering, leading to the Bachelor's degree:

1. Civil Engineering.
2. Mechanical Engineering.
3. Electrical Engineering.
4. Chemical Engineering.

Descriptions of the curriculums and schedules showing the subjects of instruction included will be found on succeeding pages.

### Tuition Fees

The tuition fee in each curriculum is one hundred and seventy-five dollars (\$175) a year for each of the four years. The tuition for freshmen is payable as follows:

#### *DIVISION A*

<i>School Periods</i>	<i>Tuition Due</i>
Sept. 10, 1923, to Jan. 26, 1924	\$75 Sept. 10, 1923
and	\$75 Nov. 19, 1923
Aug. 12, 1924, to Sept. 7, 1924	\$25 at beginning of summer term work.

#### *DIVISION B*

<i>School Periods</i>	<i>Tuition Due</i>
Jan. 28, 1924, to June 15, 1924	\$75 Jan. 28, 1924
and	\$75 April 8, 1924
June 17, 1924, to July 13, 1924	\$25 at beginning of summer term work.

### Co-operative Plan

The tuition for upper classmen is payable as follows: sixty dollars (\$60) at the beginning of the first school period; fifty dollars (\$50) at the beginning of the second school period; fifty dollars (\$50) at the beginning of the third school period; and fifteen dollars (\$15) at the beginning of the fourth school period.

## GENERAL INFORMATION

### Full-Time Plan

The tuition fee in each curriculum for full-time students is two hundred and twenty-five dollars (\$225) a year and is payable as follows:

#### *DIVISION AA*

<i>School Period</i>	<i>Tuition Due</i>
Sept. 10, 1923, to May 10, 1924	\$60 Sept. 10, 1923
	\$60 Nov. 19, 1923
	\$60 Jan. 28, 1924
	\$45 April 9, 1924

#### *DIVISION BB*

<i>School Period</i>	<i>Tuition Due</i>
Oct. 15, 1923, to June 14, 1924	\$60 Oct. 15, 1923
	\$60 Dec. 26, 1923
	\$60 March 3, 1924
	\$45 May 12, 1924

Freshmen who attend both summer terms in any one summer are charged an additional tuition fee of twenty-five dollars (\$25) for the second summer term. The tuition for special students in the summer terms is twenty-five dollars (\$25) a term.

Students who are registered for more school work than that prescribed in the catalog for the year in which they are enrolled, are charged one dollar and fifty cents (\$1.50) an hour per semester. In computing additional hours, the catalog schedules are used and both hours of exercises and hours of preparation are counted.

Failure to make the required payments on time, or to arrange for such payments, renders the student liable to be barred from his classes or suspended from Engineering Practice until the matter has been adjusted with the Bursar.

The yearly tuition fee includes membership in the Boston Y. M. C. A. This fee is not included in the tuition for special summer term students.

## SCHOOL OF ENGINEERING

### Laboratory Fees and Deposits

#### CHEMICAL LABORATORY

All students taking chemical laboratory work are required to make a deposit of ten dollars (\$10) at the beginning of each year, from which deductions are made for breakage, rentals, and destruction of apparatus in the laboratory. Any unused portion of this deposit is returned to the student at the end of the school year. In case the charge for such breakage, rentals, or destruction of apparatus is more than ten dollars (\$10), the student is charged the additional amount.

Students enrolled in the curriculums in Chemical Engineering will be charged a laboratory fee in accordance with the following rates:

<i>Course</i>	<i>Fee</i>
41-2 Inorganic Chemical Laboratory .....	\$10.00
42-2 Qualitative Analysis Laboratory .....	10.00
43-2 Quantitative Analysis Laboratory .....	10.00
44-2 Technical Analysis Laboratory .....	5.00
45-2 Organic Chemical Laboratory .....	10.00
45-4 Organic Chemical Laboratory .....	10.00
47-2 Industrial Chemical Laboratory .....	5.00

#### ELECTRICAL LABORATORY

Students taking electrical laboratory work will be charged a laboratory fee in accordance with the following rates:

<i>Course</i>	<i>Fee</i>
30-4 Applied Electricity Laboratory .....	\$5.00
32-4 Electrical Engineering II Laboratory .....	5.00
32-6 Electrical Engineering III Laboratory .....	5.00
32-8 Electrical Engineering IV Laboratory .....	10.00
32-2 Electrical Measurements Laboratory .....	5.00

These fees are intended to cover power, normal wear in use of equipment, other than measuring instruments, fuses, etc. In no case do they cover damage to instruments caused by misuse or carelessness of any kind on the part of students. In such case the repair cost will be assessed equally upon the members of the group concerned.

## GENERAL INFORMATION

### PHYSICS LABORATORY

Students taking courses in the physics laboratory will be charged a laboratory fee of \$2.00 per year.

### ENGINEERING LABORATORY

Students taking courses in engineering laboratory will be required to pay a laboratory fee of \$2.00 per year.

### TESTING MATERIALS LABORATORY

Students enrolled in the course in testing materials laboratory are charged a laboratory fee of \$2.00 per year.

### Student Activities Fee

Each student in the School is charged a Student Activities Fee of fifteen dollars (\$15). Five dollars of this fee is payable at the time of registration and is non-returnable; five dollars is payable with the second and five dollars with the third payment of tuition. This fee supports certain student activities, and includes membership in the *Northeastern Engineering Athletic Association*, subscription to the *Northeastern Tech*, the school paper, and subscription to the *Cauldron*, the college year book. The services of a physician are also available under this fee. Only minor ailments, however, are treated. Should the student show signs of more serious illness, he is immediately advised to consult a specialist or return to his home, where he can get more adequate treatment.

### Payments

All payments should be made to Galen D. Light, Bursar.

All checks should be made payable to The Bursar, Northeastern University.

### Refunds

As the College assumes the obligation of carrying the student throughout the year when the student registers, and as the College provides the instructions and accommodations on a yearly basis, no refunds are granted except in cases where students are compelled to withdraw on account of personal illness.

## **SCHOOL OF ENGINEERING**

### **Books and Supplies**

All supplies may be purchased at the College Book Store at a cost of twenty dollars (\$20) to thirty dollars (\$30) a year. The supplies for the freshman year cost somewhat more than this because a set of drawing instruments must be obtained. The earnings of the students for their services with the co-operating firms considerably exceed the cost of tuition, fees, the cost of books and supplies, and incidental expenses. The purchase of supplies is therefore not a burden to the student.

### **Elective Subjects**

Students electing any course not included in their curriculum will be required to take all examinations in that course and to attain a passing grade in it before they will be eligible for a degree.

### **Status of Students**

The ability of students to continue their courses is determined by means of daily work and examinations, but regularity of attendance and faithfulness to daily duties are considered equally essential.

When a student elects a curriculum, he is required to complete all courses included therein in order to be graduated. No subject is to be dropped, or omitted, without the consent of the Committee on Scholarship and the approval of the Dean.

Any student failing to make a satisfactory record, either in school or practical work, may be removed from his position in practical work, or from the School.

Students transferring from approved colleges will be admitted to advanced standing provided that their record warrants such a procedure. Whenever a student enters with advanced standing and it is found that he shows inadequate preparation in any of his pre-requisite subjects, the faculty reserves the right to require the student to repeat in class the subjects in question.

A special student is permitted to attend the School, subject to the approval of the faculty, and to take such courses as the School offers. Special students are not eligible for a degree.

## GENERAL INFORMATION

### Examinations

Examinations covering the work of the term are usually held at the close of each term. Exceptions may be made in certain courses where, in the opinion of the instructor, examinations are not necessary.

Condition examinations will be given in all subjects during the week of July 9, 1923, and the week of September 3, 1923. Condition examinations are not given for courses in which no final examination was given.

Special examinations can be arranged for only by vote of the Committee on Scholarship, and for all such examinations the college requires the payment of a special fee of five dollars (\$5).

### Probation

Students are placed on probation either by the Executive Committee or the Committee on Scholarship. Failure to show proper respect for constituted authority; infringement of the rules and regulations of the college; disregard of obligations to a co-operative firm, etc., constitute insubordination. All matters of insubordination are handled by the Executive Committee and the penalty for such may be probation or expulsion from the University.

Failure to meet the standards set by the Committee on Scholarship, unless the failure is supported by causes wholly beyond the student's control, will necessitate the committee placing the student on probation.

Removal from probation is in the hands of the committee placing the student thereon.

### Rules of Standing in Scholarship

A student's grade is officially recorded by letters and percentages, as follows:

A, excellent, 90-100 per cent.

B, good, 80-89 per cent.

C, fair, 70-79 per cent.

D, passable, 60-69 per cent.

F, Failure, work unsatisfactory, 40-59 per cent.

FF, complete failure, below 40 per cent.

I, incomplete.

## SCHOOL OF ENGINEERING

A mark of F in any particular subject entitles the student to make up the unsatisfactory work, or to take a condition examination. This letter is given for all grades below 60 per cent on intermediate reports.

A mark of FF denies the privilege of taking a condition examination, and the course must be repeated.

A mark of I is used for intermediate grades only and signifies that the course may not have progressed sufficiently far to give a grade or that the student has not had time to make up work lost through excusable enforced absences from class.

A student who does not remove a condition before that course is repeated a year later must take the course over again. A condition in more than one subject involves the loss of the privilege of being a candidate for graduation with the student's class, and may involve the loss of assignment to Engineering Practice.

The responsibility for the removal of a condition rests with the student, who is required to ascertain when and how the condition can be removed.

No student may qualify as a candidate for a degree in any given year unless clear in all the required subjects of the lower years of his chosen curriculum. He must also be in good standing in all courses for which he is enrolled.

Entrance requirements or preparatory subjects pursued in the School are considered as required school work.

### **Absences**

No "cuts" are allowed, and a careful record of attendance upon exercises is kept for each student. Absence from exercises regularly scheduled in any subject will seriously affect the standing of a student, and may cause the removal of the subjects from which he is absent from his schedule and the listing of these subjects as conditioned subjects. In case he presents a reasonable excuse for the absence, however, he may be allowed to make up the time lost and be given credit for the work; but he must complete the work at such time and in such manner as his instructor in the course, with the approval of the head of his department, shall designate. Laboratory

## GENERAL INFORMATION

work lost can be made up only when it is possible to arrange for the necessary time during hours when these departments are open for regularly scheduled instruction. Absences from exercises immediately preceding or following a recess are especially serious and entail severe penalizing.

Attendance at all mass meetings of the student body is compulsory. Exceptions to this rule are made only when the student has received permission from the Registrar, previous to the meeting from which he desires to be absent.

### Reports of Standing

Reports of standing of all students are issued four times a year, which will be at the end of each five-week school period. In addition to these regular periods, a special report on the subjects taken during the summer term will be issued immediately at the close of the summer term. All questions relative to marks are to be discussed with the student's faculty adviser, who, in turn, will make all necessary recommendations to the Committee on Scholarship, through the head of his department.

Every effort is made to keep the student up in his studies. Parents and students are always welcomed by the Dean, the Registrar and advisers for conference upon such matters. Special reports on a student's work will be sent to parents at the end of each five-week school period.

Parents or guardians will be notified in all cases when students are advised, or required, to withdraw from the School.

### Conduct

It is assumed that students come to the School for a serious purpose, and that they will cheerfully conform to such regulations as may from time to time be made. In case of injury to any building, or to any of the furniture, apparatus, or other property of the School, the damage will be charged to the student, or students, known to be immediately concerned; but if the persons who caused the damage are unknown, the cost for repairs may be assessed equally upon all the students of the School.

## SCHOOL OF ENGINEERING

Students are expected to behave with decorum, to obey the regulations of the School, and to pay due respect to its officers. Conduct inconsistent with the general good order of the School, or persistent neglect of work, if repeated after admonition, may be followed by dismissal, or, in case the offense be a less serious one, the student may be placed upon probation. The student so placed upon probation may be dismissed if guilty of any further offense.

It is desired to administer the discipline of the School so as to maintain a high standard of integrity and a scrupulous regard for truth. The attempt of any student to present, as his own, any work which he has not performed, or to pass any examination by improper means, is regarded as a most serious offense, and renders the offender liable to immediate expulsion. The aiding and abetting of a student in any dishonesty is also held to be a grave breach of discipline.

### Advisers

Upon entering the School each student is assigned to a faculty member as his Adviser, who takes an active interest in the student's welfare from all points, and not only guides and assists him in the satisfactory pursuit of his studies, but keeps a close watch on all matters which might tend to hamper the student in his College life, and sees that such hampering does not occur so far as possible.

In the upper years the function of the Adviser is somewhat different and tends more toward consultation and suggestions bearing on the student's plans and probable work after graduation.

## STUDENT ACTIVITIES

### STUDENT ACTIVITIES

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A moderate participation in social and athletic activities is encouraged by the Faculty, although a standard of scholarship which is incompatible with excessive devotion to such pursuits is required of all students.

#### Student Activities Committee

This committee, consisting of students elected from the various classes, has general supervision over all social functions of the School. It also aims to further the interests of such organizations as the orchestra, band, glee and banjo clubs, chess club, radio club, and other groups which do not come under the jurisdiction of any special body. The committee has opened a Student Activities Room, a club room for all members of the School. Here the various clubs may hold their meetings, and the individual may spend his time outside of class room either in study or recreation. In order to provide for the social intercourse of the students, as well as to enable the men in the different divisions to meet one another, socials and entertainments are held at such times as are convenient for all to attend.

#### The Northeastern Engineering Athletic Association

The Athletic Association consists of all members of the School. At the head of the Association is the General Athletic Committee, consisting of the Faculty Committee on Athletics and the student officers of the Athletic Association, elected from the student body. This committee has complete charge of all athletics. Under the guidance of efficient athletic coaches, track, basketball, and baseball teams are formed and schedules are arranged with other colleges for home games and games abroad. The association also encourages soccer, wrestling, swimming, interclass baseball, and tennis teams. Interclass and interdivision meets are held during the year.

## SCHOOL OF ENGINEERING

### The "Northeastern Tech"

The students issue a weekly paper called the *Northeastern Tech*. Here the students have an opportunity to express their opinions on subjects relating to study, engineering practice, social events, or topics of the day. In addition, college news, editorials, and official announcements, make this feature of activities very valuable. Positions on the editorial and business staffs of the paper are attained by competitive work.

### "The Cauldron"

"The Cauldron" is the year book of the School. The Senior Class is responsible for its publication, and the members of the staff are chosen through competitive work. The book is ready for distribution in the latter part of the second semester. It contains the usual review of the year's work and activities, a complete history of all classes in the School, all their functions, socials, pictures, etc. It also contains a complete individual history of the entire graduating class and is a souvenir highly prized in later year by all graduates.

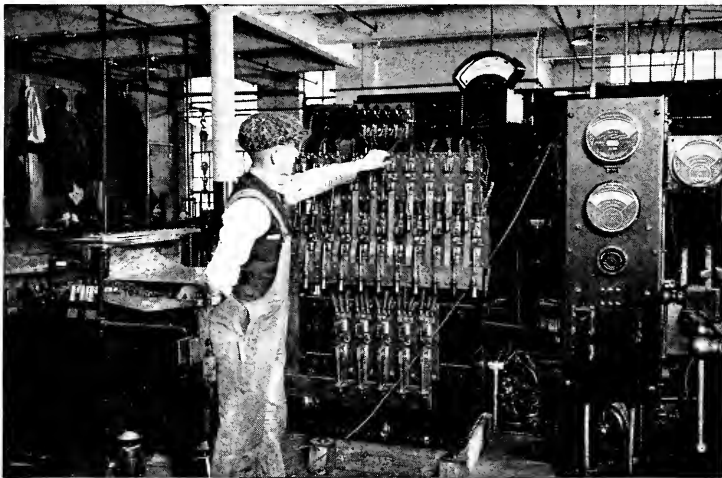
### The Handbook

Issued at the beginning of the year the purpose of the Handbook is to help promote an early intimacy with the scope of college life. The book is of special interest to new men as it contains detailed information concerning all the organizations of the School. Schedules, a daily diary, songs, cheers, and important dates in the college calendar make the book also of great value to upperclassmen.

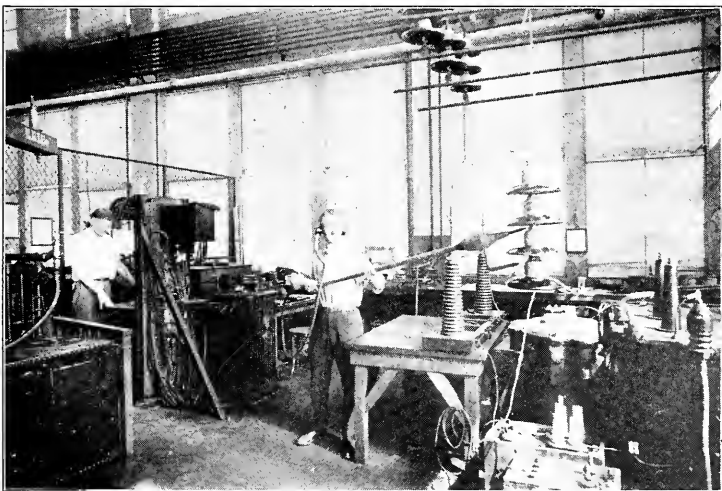
### Student Activities Fund Committee

In order to help finance the foregoing student activities, this Student Activities Fund Committee has been formed, and consists of the Chairman of the Student Activities Committee, the Editor-in-Chief of *The Northeastern Tech*, and the President of the Athletic Association. Members of the faculty interested in these branches of the activities are also on this committee. The Committee apportions the Student Activities

# Electrical Engineering Students

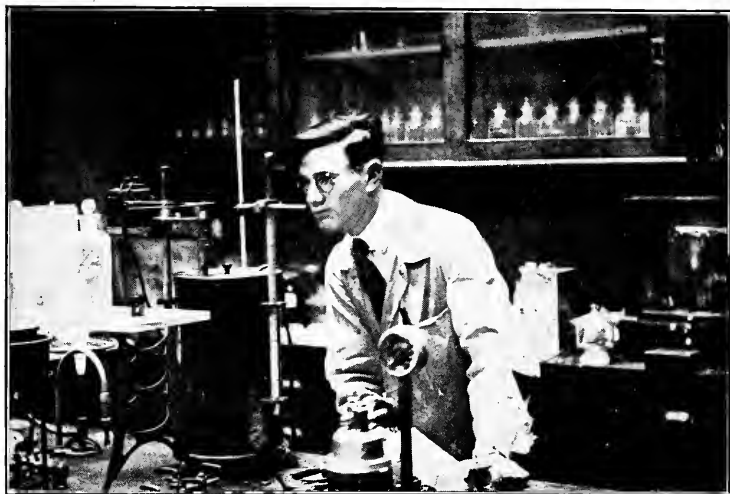


Testing a 10,000 Ampere Storage Battery Control Panel  
Condit Electrical Mfg. Co.

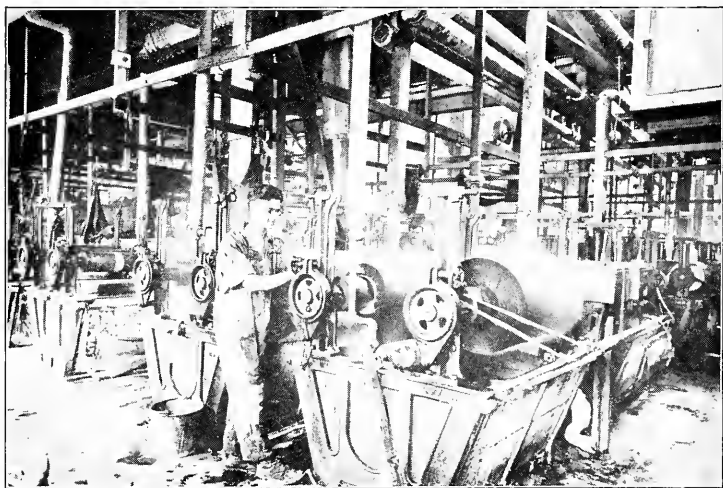


Testing Insulators  
Edison Electric Illuminating Co.

# Chemical Engineering Students



Calorimeter Testing  
Industrial Engineering Corporation



Inspecting Dyeing Machines  
Glenlyon Dye Work, Saylesville, R. I.

## **STUDENT ACTIVITIES**

Fee among the various activities. Thus the Musical Clubs, the Student Activities Room, the athletic teams, and the publications, receive their proper apportionment of the fifteen-dollar fee paid by each student.

### **Student Council**

This is the student governing body, and comprises the leaders of the various classes, organizations, clubs, and teams. It acts as a supreme student governing body. It has jurisdiction, under proper supervision of the Faculty, over all student matters, such as customs, privileges, or such other matters which can properly be decided upon by such a body.

### **The Senate**

This is an honorary society composed of men who have shown exceptional ability both by high scholastic standing and a live interest in student activities.

### **The Inter-Fraternity Council**

Elected representatives from each fraternity, as well as a non-fraternity representative from each division, make up the Inter-Fraternity Council. This body has preliminary jurisdiction over laws governing the regulation of fraternities and clubs in the School.

### **Professional Societies**

The students in the various curriculums are organized as a professional society, known as the Northeastern University Engineering Society, for the closer association of the students of the school, and for the discussion and consideration of various problems and new knowledge in the engineering field, which would not ordinarily come into their regular courses. Meetings are held every week at which the society is addressed by members of the society and by engineers of prominence.

There are four sections of the society, the Civil, Mechanical, Electrical, and Chemical Engineering Sections. These sections are affiliated either by individual membership or as a section

## SCHOOL OF ENGINEERING

with the Boston Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the American Chemical Society, thereby procuring for the individual that most valuable association with the successful practicing engineers of the community, and the various problems discussed by them.

### Annual Prizes

Prizes are awarded annually for excellence in the various departments of school activities. It is the aim of the college that such prizes should stimulate the interest of the student to attain a high proficiency in some branch of undergraduate endeavor.

### Public Speaking

Cash prizes of fifty, twenty-five, and ten dollars respectively are offered yearly for excellence in the presentation of original speeches before the School at a regular student mass meeting. All students are eligible to compete for these prizes. The regulations for the contests are published in the *North-eastern Tech* early in the year.

### Engineering Conference

The Department of Engineering Practice annually awards a silver loving cup to the man in each of the professional sections who delivers the best address before a regular meeting of the engineering society upon an engineering topic during the year. All regular students, with the exception of freshmen, may compete for these cups.

### Delta Society

#### (The Northeastern Christian Association)

The following quotations from the constitution of the Delta Society indicate the purposes of the Society and the basis of membership:—

“The purpose of this Delta Society shall be to deepen the spiritual lives of Northeastern men through the building of

## STUDENT ACTIVITIES

Christian character, to create and promote a strong and effective Northeastern University spirit in and through a unified student body, to promote sociability within and among the schools and to emphasize certain ethical, social, civic, intellectual, economic, physical, vocational and avocational values."

"Any man of good moral character, who is either a student in regular standing or a member of the faculty of Northeastern University, and who has signed a statement of his intention to help realize the purposes of the Delta Society as stated in Article II of the Constitution, is eligible to membership in the Delta Society."

It is hoped that as many students as can do so will join the Delta Society and participate in its activities.

### Northeastern University Club

The Northeastern University Club of Boston was organized in the spring of 1921, with graduates of the Schools of Law, Commerce and Finance, and Engineering as charter members.

The purpose of the Club is to promote social activities among the alumni of Northeastern University; to perpetuate the Northeastern spirit in the business life of the community; to give to their Alma Mater the benefit of the experience of the alumni in the school and of their experience in business and professional activities since their graduation.

The Club has a suite of rooms at the Hotel Bellevue which is well adapted for conferences, social events and furnishes a meeting place for the alumni.

Any man of good character, twenty-one years of age or over, who is a graduate of any of the Schools of Northeastern University granting a degree or who has attended such schools for a period of two full years is eligible for membership.

## SCHOOL OF ENGINEERING

### REQUIREMENTS FOR GRADUATION

The School grants the degrees of:

- Bachelor of Civil Engineering.
- Bachelor of Mechanical Engineering.
- Bachelor of Electrical Engineering.
- Bachelor of Chemical Engineering.

To receive the degree of the School the student must attend the School not less than one year, which must be that immediately preceding his graduation. He must complete the prescribed studies of the four years, and must, also, pass final examinations, if required, on subjects included in his curriculum. In addition to this, he must complete satisfactorily a schedule of Engineering Practice under the supervision of the Faculty. The student must, also, prepare a thesis as defined elsewhere in this catalog. All theses and records of work done in preparation of theses, are the permanent property of the School.

The credits required for the degree are as follows:

Engineering curriculum	- - - -	164 credits
Engineering Practice or General Subjects		
during sophomore and junior years	- -	48 credits
Engineering Practice during senior year	-	20 credits
		<hr/>
Total credits required for degree	- -	232

All subjects in the engineering curriculum are required and 164 credits are granted for the satisfactory completion of the equivalent of this curriculum. 24 credits are granted for the satisfactory completion of one year's work at Engineering Practice during each of the sophomore and junior years, and 20 credits for work during the senior year. Two credits are granted for the satisfactory completion of each of the general subjects which are offered on the full-time plan. Credits are granted only at the close of the school year.

The degree of the School represents not only the formal completion of the subjects in the selected course of study, but

## POSITIONS HELD BY GRADUATES

also the attainment of a satisfactory standard of general efficiency. Any student who does not show in the fourth-year work of his curriculum that he has attained such a standard, may be required, before receiving the degree, to take such additional work as shall prove his ability. A fee of ten dollars (\$10) is required of all candidates for a degree. This fee must be paid at the beginning of the second semester.

### Positions Held By Graduates

The graduates of the School have been able to secure positions of the same grade, commanding the same salaries, as the graduates of other good technical schools.. Among the positions now filled by graduates of the School are: Construction engineers, electrical engineers, power plant engineers, designing draftsmen, State and Federal employees under the Civil Service, and instructors. The success of those who have been graduated from the School is the best evidence of the value and thoroughness of the training offered.

## SCHOOL OF ENGINEERING

### PROGRAM OF STUDIES

#### General Statement

The curriculums of the various Engineering Departments and the Full-Time Plan are given on the following pages. The first year, it will be observed, is practically the same in all cases. A few exceptions are made in curriculums where students need some special elementary training in their professional subjects, in order that they may be of more use to their employers in their Engineering Practice.

The regular school year comprises two terms of ten weeks each for all students of both divisions with an additional period of four weeks for the freshmen only. The first ten-week term for each division is called the First Semester; the second ten weeks, the Second Semester; and the additional four-week period for freshmen, the Summer Term.

In the case of the full-time plan, there are three additional periods of five weeks each given in the intervals between the periods of the co-operative plan called the First Term, Second Term and Third Term in the order of their occurrence.

In the curriculums, each course is followed by two numbers: the first number, under the column marked "Ex," indicates the number of hours of "exercise" in recitation, laboratory, drawing room, or field work a week; the second number, under the column marked "Prep," indicates the number of hours of outside "preparation" that have been assigned as the minimum weekly requirement for each course. The work is so planned that the student will be required to spend from forty-eight to fifty-two hours a school week in preparation and class work.

The number preceding each course in the schedule of the various curriculums is an index number to the description of the content of the subject in the Synopsis of Courses.

Those courses preceding by 0 indicate general subjects. The work which is under the direction of the General Departments is designated as follows: 01, Department of English;

## PROGRAM OF STUDIES

02, Department of Mathematics; 03, Department of Physics; and 04, Department of Drawing, etc.

The subject numbers beginnings with 1 indicate subjects pertaining strictly to the Department of Civil Engineering; subject numbers beginning with 2, to the Department of Mechanical Engineering; 3, to the Department of Electrical Engineering; 4, to the Department of Chemical Engineering; and 5, to Administrative Engineering.

## SCHOOL OF ENGINEERING

### CIVIL ENGINEERING

The Civil Engineering curriculum is designed to give the student a broad education in those subjects which form the basis of all branches of technical education, and a special training in those subjects comprised under the term "Civil Engineering." The student receives a sound training, both theoretical and practical, in the sciences upon which professional practice is based.

Civil Engineering covers such a broad field that no one can become expert in its whole extent. It includes topographical engineering, municipal engineering, railroad engineering, structural engineering, and hydraulic and sanitary engineering. It covers land surveying, the building of railroads, harbors, docks, and similar structures; the construction of sewers, water-works, roads and streets; the design and construction of girders, roofs, trusses, bridges, buildings, walls, foundations, and all fixed structures. All of these branches of engineering rest, however, upon a relatively compact body of principles, and in these principles the students are trained by practice in the class room, drawing room, the field, and the testing laboratory.

The curriculum is designed to prepare the young engineer to take up the work of the design and construction of structures, to aid in the location and construction of steam and electric railways, and to undertake intelligently supervision of work in the allied fields of mining, architectural, and electrical engineering, and general contracting.

# CURRICULUM I. CIVIL ENGINEERING

## FIRST YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
010-1	English .....	3 6	010-1	English .....	3 6
020-1	College-Algebra .....	4 6	022-1	Analytic Geometry .....	4 6
021-1	Trigonometry .....	3 6	031-1	Physics .....	4 8
041-1	Mechanical Drawing .....	5 0	041-2	Mechanical Drawing .....	4 0
060-1	Physical Training .....	2 0	060-1	Physical Training .....	2 0
11-1	Surveying .....	2 4	11-2	Surveying .....	2 4
11-3	Surveying, F. & P. ....	5 0	11-4	Surveying, F. & P. ....	5 0
SUMMER TERM					
012-1	History of Science .....	5 10			
043-1	Descriptive Geometry ...	20 10			

## SECOND YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
023-1	Differential Calculus ....	4 6	032-2	Integral Calculus .....	3 6
032-1	Light .....	3 3	033-1	Heat .....	3 4
034-2	Physics Laboratory .....	2 2	034-3	Physics Laboratory .....	2 2
11-5	Surveying .....	2 4	12-1	Railroad Surveying .....	3 4½
11-6	Surveying, F. & P. ....	5 0	12-2	Rrd. Surveying, F. & P. ...	5 0
21-1	Applied Mechanics .....	4 5	21-2	Applied Mechanics .....	3 6
30-1	Applied Electricity I. ....	3 3	30-3	Applied Electricity II. ....	3 3
30-4	Applied Electricity Lab. ...	3 0	30-4	Applied Electricity Lab. ...	3 0

## THIRD YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
013-1	Government .....	2 4	014-1	Economics .....	2 4
050-1	Engineering Conference ...	2 0	050-1	Engineering Conference ...	2 0
13-1	Hydraulics .....	3 0	14-1	Theory of Structures .....	3 6
14-5	Structural Drawing .....	3 0	14-6	Structural Drawing .....	3 0
16-4	Geology .....	2 4	16-2	Testing Materials Lab. ...	2 2
21-3	Strength of Materials ....	3 6	21-3	Strength of Materials ....	3 6
OPTION 1					
12-3	Railroad Engineering .....	2 4	23-3	Heat Engineering .....	3 6
12-4	Rrd. Engineering, F. & P. 5	0	40-1	Inorganic Chemistry .....	4 4
OPTION 2					
50-1	Industrial Organization....	2 4	50-2	Industrial Finance .....	2 4
51-1	Principles of Accounting..	3 6	52-1	Banking & Securities .....	3 6

## FOURTH YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
050-1	Engineering Conference....	2 0	050-1	Engineering Conference ....	2 0
052-1	Thesis .....	1 3	052-1	Thesis .....	1 6
14-3	Engineering Structures .....	6 9	14-3	Engineering Structures ....	6 9
14-7	Structural Design .....	6 3	14-8	Structural Design .....	6 3
16-1	Materials .....	2 4	OPTION 1		
15-1	Concrete .....	2 4			
15-2	Concrete Design .....	3 0			
16-3	Foundations .....	2 2	15-1	Concrete .....	2 4
OPTION 2					
50-6	Business Administration ..	3 6	50-4	Business Management .....	3 6
54-1	Marketing .....	3 6	53-1	Business Low .....	2 4

## SCHOOL OF ENGINEERING

### MECHANICAL ENGINEERING

The Mechanical Engineering Curriculum is designed to give the student a broad foundation in those fundamental subjects which form the basis for all professional engineering practice, and especially to equip the young engineer with a knowledge of the various phases of Mechanical Engineering. The curriculum embraces instruction by text-book, lecture, laboratory, and workshop practice, with special reference to the following branches: applied mechanics, heat engineering, industrial engineering, hydraulic engineering, applied electricity, and machine design.

The instruction aims to develop in the student the ability to think clearly and logically in the application of fundamental principles to engineering problems. The class-room work in the professional subjects is arranged with due regard to modern industrial conditions, in order that the student may connect theory with practice and appreciate the necessity of both in order to become a successful engineer. With this in view, special courses are given involving a discussion of problems which have presented themselves to the students and requiring a familiarity with the contents of current engineering periodicals. At all times it is sought to develop self-confidence in the student, and he is encouraged to take the initiative.

## CURRICULUM II. MECHANICAL ENGINEERING

### FIRST YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
010-1	English .....	3 6	010-1	English .....	3 6
020-1	College Algebra .....	4 6	022-1	Analytic Geometry .....	4 6
021-1	Trigonometry .....	3 6	031-1	Physics .....	4 8
041-1	Mechanical Drawing .....	5 0	041-3	Mechanical Drawing .....	8 1
060-1	Physical Training .....	2 0	060-1	Physical Training .....	2 0
24-1	Production Engineering .....	4 6	40-1	Inorganic Chemistry .....	4 4
SUMMER TERM					
012-1		History of Science .....	5	10	
043-1		Descriptive Geometry .....	20	10	

### SECOND YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
023-1	Differential Calculus .....	4 6	023-2	Integral Calculus .....	3 6
032-1	Light .....	3 3	033-1	Heat .....	3 4
034-2	Physics Laboratory .....	2 2	034-3	Physics Laboratory .....	2 2
042-3	Machine Drawing .....	6 0	044-3	Mechanism .....	6 6
044-2	Mechanism .....	2 4	21-2	Applied Mechanics .....	3 6
21-1	Applied Mechanics .....	4 5	30-3	Applied Electricity II .....	3 3
30-1	Applied Electricity I .....	3 3	30-4	Applied Electricity Lab. ....	3 0
30-4	Applied Electricity Lab. ....	3 0			

### THIRD YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
013-1	Government .....	2 4	014-1	Economics .....	2 4
050-1	Engineering Conference ..	2 0	050-1	Engineering Conference ..	2 0
21-3	Strength of Materials .....	3 6	21-3	Strength of Materials .....	3 6
22-1	Graphical Analysis .....	6 3	22-2	Machine Design .....	6 3
23-1	Heat Engineering .....	3 6	23-1	Heat Engineering .....	3 6
OPTION 1					
13-1	Hydraulics .....	3 6	13-2	Hydraulic Motors .....	2 4
24-3	Power Plant Equipment ..	2 4	22-5	Mechanisms of Machines ..	3 3
OPTION 2					
50-1	Industrial Organization ..	2 4	50-2	Industrial Finance .....	2 4
51-1	Principles of Accounting ..	3 6	52-1	Banking & Securities .....	3 6

### FOURTH YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
050-1	Engineering Conference ..	2 0	050-1	Engineering Conference ..	2 0
052-1	Thesis .....	1 3	052-1	Thesis .....	1 6
16-1	Materials .....	2 4	24-4	Power Plant Engineering ..	3 6
22-3	Machine Design .....	6 3	24-6	Standard Eng. Products and Processes .....	2 4
25-1	Industrial Plants .....	4 6	25-1	Industrial Plants .....	6 3
OPTION 1					
15-3	Concrete .....	2 4	22-4	Machine Design .....	6 3
23-5	Heat Engineering .....	3 6	23-4	Steam Turbines .....	2 4
23-6	Engineering Laboratory ..	2 2	23-6	Engineering Laboratory ..	2 2
OPTION 2					
50-6	Business Administration ...	3 6	23-2	Engineering Laboratory ...	2 2
54-1	Marketing .....	3 6	50-4	Business Management ....	3 6
			53-1	Business Law .....	2 4

## SCHOOL OF ENGINEERING

### ELECTRICAL ENGINEERING

Probably none of the branches of scientific knowledge has been so markedly modified during the past decade as that relating to Electricity, nor has any other exerted such a profound influence upon the scientific thought of the period. A science, like a planet, grows in the main by a process of infinitesimal accretion. Its theory is built like a cathedral through the addition by many builders of many different elements, and this is pre-eminently true of Electricity. It is absolutely essential that the electrical engineer who hopes to make a success of his work should be able to grasp readily and absorb effectively the meaning and content of the many scientific memoirs recording the results of research bearing upon and directly influencing his chosen branch of engineering.

He must have a thorough appreciation of physical theory, a clear understanding of chemical principles, and a broad working knowledge of mathematics. It is essential that each student planning to take this curriculum should realize the fundamental necessity of obtaining a solid grounding in these three subjects upon which the success of his future work will definitely hinge, nor can he be too strongly urged to include physics in his high school preparatory course if he hopes to avoid difficulty in the earlier years.

It is not the purpose of the curriculum to attempt the impossible in aiming to turn out electrical engineers, fully trained in all the branches of the science, especially as it is becoming daily more differentiated and specialized. The curriculum is designed rather to lay a broad and secure foundation for future progress along the lines of activity which may particularly appeal to each individual student and give him a good working knowledge of the essential principles which underlie each of the more specialized branches of professional work.

Parallel with the theoretical work runs a carefully planned course of laboratory instruction which is intended to develop the student's power of accurate observation, of planning work and methods of procedure for himself with due regard to saving of time and labor and precision of the results attained.

# CURRICULUM III. ELECTRICAL ENGINEERING

## FIRST YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
010-1	English .....	3 6	010-1	English .....	3 6
020-1	College Algebra .....	4 6	022-1	Analytic Geometry .....	4 6
021-1	Trigonometry .....	3 6	031-1	Physics .....	4 8
041-1	Mechanical Drawing .....	5 0	041-3	Mechanical Drawing .....	8 1
060-1	Physical Training .....	2 0	060-1	Physical Training .....	2 0
32-1	Elect. Eng. I .....	2 3	32-1	Elect. Eng. I .....	3 3
40-1	Inorganic Chemistry .....	4 4			
SUMMER TERM					
	012-1	History of Science .....	5	10	
	043-1	Descriptive Geometry .....	20	10	

## SECOND YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
023-1	Differential Calculus .....	4 6	023-2	Integral Calculus .....	3 6
032-1	Light .....	3 3	033-1	Heat .....	3 4
034-2	Physics Laboratory .....	2 2	034-3	Physics Laboratory .....	2 2
042-5	Engineering Drawing .....	3 0	042-5	Engineering Drawing .....	3 0
21-1	Applied Mechanics .....	4 5	21-2	Applied Mechanics .....	3 6
32-3	Elect. Eng. II .....	3 6	32-3	Elect. Eng. II .....	3 6
32-4	Elect. Eng. II Lab.....	6 3	32-4	Elect. Eng. II Lab.....	6 3

## THIRD YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
013-1	Government .....	2 4	014-1	Economics .....	2 4
050-1	Engineering Conference ..	2 0	050-1	Engineering Conference ..	2 0
21-4	Strength of Materials .....	3 6	13-3	Hydraulics .....	2 4
32-6	Elect. Eng. III Lab. ....	6 3	23-7	Heat Engineering .....	3 6
23-7	Heat Engineering .....	3 6	32-6	Elect. Eng. III Lab.....	6 3
32-7	Elect. Eng. III .....	3 6	32-7	Elect. Eng. III .....	3 4
33-1	Elect. Measurements .....	2 4	33-1	Elect. Measurements .....	2 3
33-2	Elec. Measurements Lab..	3 3	33-2	Elect. Measurements Lab..	3 3

## FOURTH YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
050-1	Engineering Conference ..	2 0	050-1	Engineering Conference ..	2 0
052-1	Thesis .....	1 3	052-1	Thesis .....	1 6
23-2	Engineering Laboratory ..	2 2	24-6	Standard Eng. Products and Processes .....	2 4
32-8	Elect. Eng. IV Lab.....	6 3	32-8	Elect. Eng. IV Lab.....	6 3
32-9	Elect. Eng. IV .....	4 8	32-9	Elect. Eng. IV .....	4 8
33-4	Advanced Standard Lab..	3 3	34-1	Elect. Eng. V .....	4 6
34-1	Elect. Eng. V .....	4 6	35-1	Advanced Electricity .....	2 2
35-1	Advanced Electricity .....	2 3			

## SCHOOL OF ENGINEERING

### CHEMICAL ENGINEERING

The efficiency of any industrial chemical enterprise depends not only upon a knowledge of the chemical reactions forming the basis of the process, but also upon a knowledge of the mechanical principles on which depend the design, construction and maintenance of the plant for the carrying on of these reactions. Owing to the keen competition among industries which must follow the abnormal war-time production, it will be necessary to maintain the highest possible efficiency.

The purpose of this curriculum is to prepare students capable of filling the demand for trained men competent to build and operate manufacturing industries based upon chemical principles at their maximum efficiency. The professional work of the curriculum falls naturally into three groups: First, courses which provide a knowledge of the fundamental principles of chemistry. Second, those courses which furnish a knowledge of mechanical engineering. Third, engineering practice in which the student becomes familiar with the many applications of theoretical principles.

The laboratory work has been planned not only to familiarize the student with many types of chemical compounds and apparatus, but also to train the student to be an exact and logical thinker, and to encourage a desire for the application of his knowledge and training to the investigation and solution of the many problems which modern industry presents.

## CURRICULUM IV. CHEMICAL ENGINEERING

### FIRST YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
010-1	English .....	3 6	010-1	English .....	3 6
020-1	College Algebra .....	4 6	022-1	Analytic Geometry .....	4 6
021-1	Trigonometry .....	3 6	031-1	Physics .....	4 8
041-1	Mechanical Drawing ....	5 0	041-2	Mechanical Drawing ....	4 0
060-1	Physical Training .....	2 0	060-1	Physical Training .....	2 0
41-1	Inorganic Chemistry .....	4 4	41-1	Inorganic Chemistry .....	4 4
41-2	Inorganic Chemistry Lab..	5 0	41-2	Inorganic Chemistry Lab..	5 0
SUMMER TERM					
42-1	Qualitative Analysis .....	10 20			
42-2	Qualitative Analysis Lab...	28 0			

### SECOND YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
023-1	Differential Calculus ....	4 6	011-1	German .....	2 4
032-1	Light .....	3 3	023-2	Integral Calculus .....	3 6
034-2	Physics Laboratory .....	2 2	033-1	Heat .....	3 4
042-6	Engineering Drawing ....	3 0	034-3	Physics Laboratory .....	2 2
21-1	Applied Mechanics .....	4 5	042-6	Engineering Drawing ....	3 0
30-1	Applied Electricity I.....	3 3	21-2	Applied Mechanics .....	3 6
43-1	Quantitative Analysis ....	2 4	30-3	Applied Electricity II....	3 3
43-2	Quantitative Anal. Lab...	5 0	43-2	Quantitative Anal. Lab..	5 0

### THIRD YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
011-2	German .....	2 2	014-1	Economics .....	2 4
013-1	Government .....	2 4	050-1	Engineering Conference ...	2 0
050-1	Engineering Conference ...	2 0	13-3	Hydraulics .....	2 4
21-4	Strength of Materials ...	3 6	23-3	Heat Engineering .....	3 6
44-1	Technical Analysis .....	3 6	44-3	Technical Analysis .....	2 4
44-2	Technical Analysis Lab..	5 0	45-1	Organic Chemistry .....	3 6
45-1	Organic Chemistry .....	3 6	45-2	Organic Chemistry Lab. ...	5 0
45-2	Organic Chemistry Lab....	5 0	46-2	Chemical Engineering ....	2 4

### FOURTH YEAR

FIRST SEMESTER		Hours per week Ex. Prep.	SECOND SEMESTER		Hours per week Ex. Prep.
050-1	Engineering Conference ...	2 0	050-1	Engineering Conference ...	2 0
052-1	Thesis .....	1 3	052-1	Thesis .....	1 6
45-3	Organic Chemistry .....	2 6	45-3	Organic Chemistry .....	2 6
45-4	Organic Chemistry Lab...	5 0	45-4	Organic Chemistry Lab....	5 0
46-3	Chemical Engineering ....	3 6	46-3	Chemical Engineering ....	3 6
47-1	Industrial Chemistry .....	3 3	47-1	Industrial Chemistry .....	2 2
47-2	Industrial Chemistry Lab..	4 0	47-2	Industrial Chemistry Lab..	4 0
48-1	Physical Chemistry .....	4 8	48-1	Physical Chemistry .....	4 8

# CURRICULUM FOR THE FULL-TIME PLAN

## FIRST TERM

SECOND YEAR		Hours per week Ex. Prep.	THIRD YEAR		Hours per week Ex. Prep.
010-2	Literature I .....	3 6	010-5	Public Speaking I .....	3 6
012-2	Modern History I.....	3 6	014-6	Labor Problems .....	3 6
014-1	Psychology .....	3 6	50-8	Business Administration I. 3	6
50-7	Industrial Organization ...	3 6	54-2	Economic Geography .....	3 6
51-3	Principles of Accounting 1	3 6	54-5	Railway Transportation ...	3 6

## SECOND TERM

SECOND YEAR		Hours per week Ex. Prep.	THIRD YEAR		Hours per week Ex. Prep.
010-3	Literature II .....	3 6	010-6	Public Speaking II .....	3 6
012-3	Modern History II.....	3 6	014-7	Labor Legislation .....	3 6
014-2	Sociology I .....	3 6	50-9	Business Administration II. 3	6
51-4	Principles of Accounting II	3 6	54-3	Marketing I .....	3 6
52-3	Industrial Finance .....	3 6	54-6	Railroad Problems .....	3 6

## THIRD TERM

SECOND YEAR		Hours per week Ex. Prep.	THIRD YEAR		Hours per week Ex. Prep.
010-4	Literature III .....	3 6	010-7	Public Speaking III .....	3 6
013-2	State & Municipal Gov... 3	6	014-5	Outline of Ethics .....	3 6
014-3	Sociology II .....	3 6	50-10	Business Management ....	3 6
51-5	Cost Accounting .....	3 6	53-2	Business Law .....	3 6
52-2	Banking .....	3 6	54-4	Marketing II .....	3 6

## PROGRAM OF STUDIES

### SUBJECTS OF INSTRUCTION

Instruction is given by lectures and recitations, and by practical exercises in the field, in the laboratories, and in the drawing rooms. A great value is set upon the educational effect of these exercises, and they form the foundation of each of the four curriculums. In many branches the instruction given differs widely from available texts in which cases notes on the lectures and laboratory work are usually issued to the students. Besides oral examinations in connection with the ordinary exercises, written examinations are held from time to time.

In the following pages will be found a more or less detailed statement of the scope of the subjects offered in the various curriculums. The subjects are classified, as far as possible, related studies being arranged in sequence. The subjects are numbered for convenience in consulting the various curriculums. A complete table of the Subjects of Instruction will be found at the end of the catalog. Under each subject is given a list of the courses required as preparation for that subject. These requirements are made as it is felt that the student must have become proficient in all these subjects for a clear comprehension of the advanced work. In some cases, the required preparation may be taken simultaneously and must be completed before further advanced work is undertaken.

Students electing any subject must complete that subject in order to be a candidate for a degree.

By careful consideration of the curriculums, in connection with the following Synopses of Courses, the applicant for a special curriculum may select, for the earlier part of that curriculum, such subjects as will enable him to pursue later those more advanced subjects which he may particularly desire. Applications for exception from the required preparation as stated in connection with each subject described below, will be passed on by the Faculty.

The topics included in the list which follows are subject to change at any time by action of the School authorities.

## SCHOOL OF ENGINEERING

### SYNOPSSES OF COURSES

In the following synopses under each course, "curriculums" refers to the four principal curriculums of Civil I, Mechanical II, Electrical III, and Chemical IV. In the case of curriculums I and II, there are two options open to the students, the straight Engineering option, which is designated by a subscript 1 on the curriculum number, and the Administrative option, which is designated by a subscript 2. For example, I<sub>1</sub> refers to option 1 of Curriculum I. When "Full-time plan" appears after the word *Curriculum*, it designates that the course is included in the Full-Time Plan of studies and not the Co-operative Plan. The courses themselves are arranged in groups according to the departments in which the course is given.

The "year" refers to the time when the subject is ordinarily taken under the regular schedule, "both semesters" referring to both the First and Second Semesters, and "Summer Term" referring to the four-week term starting in June or in August. "Preparation" gives the courses by number that the student must have taken and passed satisfactorily before he may be permitted to take the course under discussion, except in a few stated cases where the preparation may be taken simultaneously.

Under the number of "hours per week," "Ex." refers to the hours of class room or laboratory work, and "Prep." to the hours of outside preparation. The main body of the synopsis shows in a brief form the ground covered by the course. At the end of the synopsis is given the names of the instructors for that particular subject; the first named being in charge.

## PROGRAM OF STUDIES

### GENERAL DEPARTMENTS

#### Liberal Subjects

##### 010-1 ENGLISH

*All curriculums*

*Preparation: — —*

*First year, both semesters*

*Three hours per week*

English Composition especially adapted to the needs of men who expect to follow the engineering profession. The work consists of lectures, recitations, class discussions, weekly themes, tests, reports, and a limited amount of outside reading, particularly in modern scientific journals. The material for the themes is largely drawn from, or related to, the student's study in the laboratory and experience in his Engineering Practice with the co-operating firm.

PROFESSORS MELVIN, ROLLAND.

MR. JEFFERY.

##### 010-2 LITERATURE I

*Full-time curriculum*

*Preparation: 010-1*

*Second year, first term*

*Three hours per week*

The course will consist of lectures with supplementary readings in American and English literature. The aim of the course will be to develop an acquaintance with and an appreciation of good literature. The reading list is arranged to be interesting to Engineers and will include such authors as Huxley, Darwin, Wells, James, and Spencer as well as more widely taught classics.

PROFESSOR MELVIN.

##### 010-3 LITERATURE II

*Full-time curriculum*

*Preparation: 010-1*

*Second year, second term*

*Three hours per week*

A continuation of 010-2 Literature I.

PROFESSOR MELVIN.

##### 010-4 LITERATURE III

*Full-time curriculum*

*Preparation: 010-1*

*Second year, third term*

*Three hours per week*

A continuation of 010-3 Literature II.

PROFESSOR MELVIN.

## SCHOOL OF ENGINEERING

### 010-5 PUBLIC SPEAKING I

*Full-time curriculum*  
*Third year, first term*

*Preparation: 010-1*  
*Three hours per week*

This course will offer practical training in the preparation and presentation of the various types of speeches. The instruction will be planned to eliminate defects of voice, posture, etc., and to develop in the student an ability to speak easily, naturally and forcefully.

PROFESSOR MELVIN.

### 010-6 PUBLIC SPEAKING II

*Full-time curriculum*  
*Third year, second term*

*Preparation: 010-1*  
*Three hours per week*

A continuation of 010-5 Public Speaking I.

PROFESSOR MELVIN.

### 010-7 PUBLIC SPEAKING III

*Full-time curriculum*  
*Third year, third term*

*Preparation: 010-1*  
*Three hours per week*

A continuation of 010 Public Speaking II.

PROFESSOR MELVIN.

### 011-1 GERMAN

*Curriculum: IV*  
*Second year, second semester*

*Preparation: — —*  
*Two hours per week*

All students in the Chemical Engineering Curriculum are required to show before graduation a sufficient knowledge of the German language to be able to read technical books and scientific articles written in the German language. For students who have not obtained this knowledge before entering college, this course will offer a study of grammatical forms, syntax, and vocabulary through composition exercises and rapid reading. The entire purpose is to give the student a knowledge of German grammar with a working vocabulary of scientific terms.

MR. PERKINS.

### 011-2 GERMAN

*Curriculum: IV*  
*Third year, first semester*

*Preparation: 011-1*  
*Two hours per week*

A continuation of German 011-1.

MR. PERKINS.

## PROGRAM OF STUDIES

### 012-1 HISTORY OF SCIENCE

*Curriculums: I, II, III*

*First year, summer term*

*Preparation: — —*

*Five hours per week*

The aim is to give a broad view of the growth of science, extend the range of the student's interests, and encourage discriminating scientific reading. Considerable collateral reading is required of the students.

PROFESSOR MELVIN.

### 012-2 MODERN HISTORY I

*Full-time curriculum*

*Second year, first term*

*Preparation: — —*

*Three hours per week*

Brief survey of European and American movements, political, social, and industrial since 1700. The aim of the course is to provide a background for the understanding of current historical movements.

PROFESSOR SCHLAGENHAUF.

### 012-3 MODERN HISTORY II

*Full-time curriculum*

*Second year, second term*

*Preparation: — —*

*Three hours per week*

A continuation of 012-2 Modern History I.

PROFESSOR SCHLAGENHAUF.

### 013-1 GOVERNMENT

*All curriculums*

*Third year, first semester*

*Preparation: — —*

*Two hours per week*

The theory and practice of government in the existing forms of national organization in the United States and Great Britain. The relations between the executive, the legislature, and the judiciary will form the basis of investigation. In the lectures additional illustrative material will be taken from France, Switzerland, and Canada. It is hoped that the men will look on the study of government, not as academic but as practical, through constant reference to contemporary men and affairs.

PROFESSOR MELVIN.

### 013-2 STATE AND MUNICIPAL GOVERNMENT

*Full-time curriculum*

*Second year, third term*

*Preparation: — —*

*Three hours per week*

This course is designed to give a summary view of state and city political organizations. Types, forms, and advantages of the various forms will be considered.

PROFESSOR SCHLAGENHAUF.

## SCHOOL OF ENGINEERING

### 014-1 ECONOMICS

*All curriculums*

*Preparation: — —*

*Third year, second semester*

*Two hours per week*

A rapid survey of the elementary principles of economics, such as those of wealth, labor, capital, value, price, and so forth. Particular attention is paid to the consideration of money, the mechanism of exchange, banking and its relation to the finances of corporations. In studying the distribution of wealth, considerable attention is paid to the questions of wages and value, and their relation to business profits.

PROFESSOR SCHLAGENHAUF.

### 014-2 SOCIOLOGY I

*Full-time curriculum*

*Preparation: — —*

*Second year, second term*

*Three hours per week*

This course is desired to give a rapid survey of the content of social laws, social evolution, and social progress. Physical, psychological, economic, and political factors in social progress. Lectures and assigned outside readings.

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### 014-3 SOCIOLOGY II

*Full-time curriculum*

*Preparation: — —*

*Second year, third term*

*Three hours per week*

The course will deal with Social institutions, charities, public health, immigration, labor problems, etc.

PROFESSOR SCHLAGENHAUF.

### 014-4 PSYCHOLOGY

*Full-time curriculum*

*Preparation: — —*

*Second year, first term*

*Three hours per week*

This course is intended to give a brief systematic survey of the principles of psychology and their application. A brief description of the nervous system, followed by an account of the various sensations, and the role they play in human behavior, will constitute the material for study.

## PROGRAM OF STUDIES

### 014-5 OUTLINES OF ETHICS

*Full-time curriculum*  
*Third year, third term*

*Preparation: — —*  
*Three hours per week*

This course aims to study the moral consciousness of man, with special reference to man's instincts, duty, freedom, sociability.

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### 014-6 LABOR PROBLEMS

*Full-time curriculum*  
*Third year, first term*

*Preparation: — —*  
*Three hours per week*

A brief survey of the economic and social relation of employer and employed will be made. Topics to be considered are such as history of unionism, policies of labor unions, types of unions, collective bargaining, etc.

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### 014-7 LABOR LEGISLATION

*Full-time curriculum*  
*Third year, second term*

*Preparation: — —*  
*Three hours per week*

This course is a continuation of that on Labor Problems. Workmen's Compensation, Industrial courts, court decisions on strikes, lockouts, etc., are among the topics to be discussed.

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## SCHOOL OF ENGINEERING

### MATHEMATICS

#### 020-1 COLLEGE ALGEBRA

*All curriculums*

*First year, first semester*

*Preparation: — —*

*Four hours per week*

The study of algebra is scheduled to begin with the solution of the quadratic equation. However a rapid although thorough review of the simpler operations of algebra precedes this. The solution of the quadratic and simultaneous quadratics is followed by a study of the theory of exponents, series, determinants, and principles of the theory of equations. Time permitting, the course includes graphs, permutations and combinations, and principles of vector analysis.

PROFESSORS ALVORD, COOLIDGE.

MESSRS. GRAMSTORFF, HUBBARD, REYNOLDS.

#### 021-1 TRIGONOMETRY

*All curriculums*

*First year, first semester*

*Preparation: 020-1 taken  
concurrently*

*Three hours per week*

Trigonometric function as ratios; transformation and solution of trigonometric equations; inverse functions; circular function; goniometry; logarithms; solution of exponential equations; solution of right and oblique triangles; law of sines, cosines, and tangents; areas. Considerable practice in calculations of practical problems enable the student to apply his trigonometry to problems arising in Engineering Practice at an early stage. Explanation of laws of spherical trigonometry.

PROFESSORS SPEAR, COOLIDGE.

MESSRS. GRAMSTORFF, PARSONS.

#### 022-1 ANALYTIC GEOMETRY

*All curriculums*

*First year, second semester*

*Preparation: 021-1*

*Four hours per week*

Cartesian and polar co-ordinates. The equations of straight lines and simpler curves derived from the geometric properties of the curves. Properties of curves derived from their equations. Thorough study of straight line, circle, and conic sections. Intersection of curves, transformation of axes. Plotting of polynomials, including exponential, trigonometric, and

## PROGRAM OF STUDIES

logarithmic functions. Loci problems. An endeavor is made to develop the analytic sense in the student throughout the course, rather than to rely on the use of formulae.

PROFESSORS SPEAR, COOLIDGE.

MR. PARSONS.

### 023-1 DIFFERENTIAL CALCULUS

*All curriculums*

*Second year, first semester*

*Preparation: 022-1*

*Four hours per week*

Theory of limits; rates of change; differentiation of algebraic, trigonometric, exponential, and logarithmic functions; slopes of curves; maxima and minima, with practical problems; partial differentiation; derivatives of higher order; lengths of curves; radius of curvature, etc.; expansion of functions, series.

Although the subject matter deals with considerable theory, constant sight is kept of the practical application of all the theory. The geometric interpretation of every new subject is carefully defined, and problems are continually solved dealing in practical applications of theory. Velocity and acceleration problems in mechanics are typical of those used for application of differentiation.

PROFESSOR SPEAR.

MR. HUBBARD.

### 023-2 INTEGRAL CALCULUS

*All curriculums*

*Second year, second semester*

*Preparation: 023-1*

*Three hours per week*

A continuation of Calculus, 023-1. Integration as the inverse of differentiation; integration as a summation; definite integrals; use of tables; double and triple integrals; areas in rectangular and polar co-ordinates; volumes; center of gravity; moment of inertia. Practical problems depending on the differential and integral calculus for solution. Solution of simpler differential equations.

PROFESSOR SPEAR.

MR. HUBBARD.

## SCHOOL OF ENGINEERING

### PHYSICS

All students in the first year are required to take an examination in elementary physics. Men failing to receive a satisfactory grade are required to add courses 30-1 Physics and 34-1 Physics Laboratory to their program of studies.

#### 030-1 PHYSICS

— —  
*First year, first semester*

*Preparation: — —  
Two hours per week*

A course in the fundamental principles of elementary physics to be taken by students who have not had sufficient preparation for the subsequent courses in physics. The course includes the principles of mechanics, heat, light, and sound, with problems, lectures, and experiments.

PROFESSOR COOLIDGE.

#### 031-1 PHYSICS

— —  
*First year, second semester*

*Preparation: 020-1, 030-1  
Four hours per week*

A study of the principles of mechanics, statics, and dynamics. The subjects studied are: equilibrium of bodies acted upon by parallel forces, equilibrium of bodies acted upon by concurrent forces, vectors, relative velocities, uniform velocity, uniformly accelerated motion, simple harmonic motion, motion on an inclined plane, energy, work, horse-power, angular velocity and acceleration, moment of inertia, kinetic energy of rotation, centrifugal force, fluid pressure, density and specific gravity of solids and liquids, Boyles law, and hydrometers. It is the purpose of the course to lay a thorough foundation for subsequent study of experimental and technical physics. Hence it is planned to familiarize the pupil with the fundamental principles of the science.

PROFESSOR COOLIDGE.

MR. STEARNS.

#### 032-1 LIGHT

*All curriculums  
Second year, first semester*

*Preparation: 020-1, 030-1  
Three hours per week*

The study of light, including wave motion, mirrors, refraction, lenses, optical instruments, dispersion, interference, diffraction, and polarization of light.

PROFESSOR COOLIDGE.

## PROGRAM OF STUDIES

### 033-1 HEAT

*All curriculums*

*Preparation: 030-1*

*Second year, second semester*

*Three hours per week*

The topics studied are: thermometry, expansion of solids, liquids, and gases, calorimetry, change of state including latent heat of fusion and vaporization (sublimation), triple point diagram, conduction and radiation, and the mechanical equivalent of heat.

PROFESSOR COOLIDGE.

### 034-1 PHYSICS LABORATORY

— —

*Preparation: — —*

*First year, second semester*

*Two hours per week*

A series of experiments of an elementary grade for students who are found to be deficient in the fundamentals of physics.

PROFESSOR COOLIDGE.

MR. STEARNS AND ASSISTANTS.

### 034-2 PHYSICS LABORATORY

*All curriculums*

*Preparation: 034-1*

*Second year, first semester*

*Two hours per week*

Experiments on mechanics performed by each student, supplementing the lecture and class room work in Physics 031-1. The experiments include the use of verniers, micrometers, and spherometers, calculation of true weights, determination of specific gravities of solids by various methods, areas by planimeter, modulus of elasticity, and motion on an inclined plane.

PROFESSOR COOLIDGE.

MR. STEARNS AND ASSISTANTS.

### 034-3 PHYSICS LABORATORY

*All curriculums*

*Preparation: 032-1, 033-1  
taken concurrently*

*Second year, second semester*

*Two hours per week*

A series of experiments on light and heat to supplement the work done in Physics 032-1 and 033-1. The experiments on light include the determination of the index of refraction of a lens, the position of images in combinations of lenses, and the uses of the spectrometer and spectroscope. The experiments

## SCHOOL OF ENGINEERING

on heat include the calibration of a thermometer, determination of the temperature of a mixture, the relations between the pressure and boiling point of water, and the use of the air thermometer.

PROFESSOR COOLIDGE.

MR. STEARNS AND ASSISTANTS.

## DRAWING

### 041-1 MECHANICAL DRAWING

*All curriculums*

*First year, first semester*

*Preparation: — —*

*Five hours per week*

An elementary course embracing straight line and compass exercises, geometrical constructions, lettering, orthographic projection and development.

PROFESSORS ASHLEY AND GEE.

MESSRS. BROWN AND REYNOLDS.

### 041-2 MECHANICAL DRAWING

*Curriculums: I, IV*

*First year, second semester*

*Preparation: 041-1*

*Four hours per week*

A continuation of Mechanical Drawing 041-1, comprising problems in isometric drawing, perspective, and freehand drawing.

PROFESSORS ASHLEY AND GEE.

MESSRS. BROWN AND REYNOLDS.

### 041-3 MECHANICAL DRAWING

*Curriculums: II, III*

*First year, second semester*

*Preparation: 041-1*

*Eight hours per week*

A continuation of Mechanical Drawing 041-1 comprising problems in perspective, isometric drawing, tracing and elementary machine drawing.

PROFESSORS ASHLEY AND GEE.

MESSRS. BROWN AND REYNOLDS.

### 042-3 MACHINE DRAWING

*Curriculum: II*

*Second year, first semester*

*Preparation: 041-3*

*Six hours per week*

Reading and translating drawings. Detailed and assembly drawings of machine parts and simple machines are made from

## PROGRAM OF STUDIES

freehand sketches and other data, but nothing in the nature of a copy is permitted. Designed to give a thorough foundation for the study of machine design.

PROFESSOR ASHLEY.

### 042-5 ENGINEERING DRAWING

*Curriculum: III* *Preparation: 041-3*  
*Second year, both semesters* *Three hours per week*

This course comprises problems in mechanical and free-hand perspective, elementary machine drawing, freehand machine sketching and problems and class room discussions on simple mechanism of machines.

PROFESSOR ASHLEY.

### 042-6 ENGINEERING DRAWING

*Curriculum: IV* *Preparation: 041-2*  
*Second year, both semesters* *Three hours per week*

This course consists of problems in developments and intersections of solids, isometric drawing, and other pictorial representations.

PROFESSOR GEE.

### 043-1 DESCRIPTIVE GEOMETRY

*Curriculums: I, II, III* *Preparation: 041-1*  
*First year, summer terms* *Twenty hours per week*

A study of the principles of descriptive geometry and their application to engineering by the solution of many problems in which theory and practice are closely correlated. Classroom exercises are devoted entirely to drafting board problems, preparation for which is obtained by the outside study of text-book references and practical problems.

PROFESSORS ASHLEY AND GEE.

MESSRS. BROWN AND REYNOLDS.

### 044-2 MECHANISM

*Curriculum: II* *Preparation: 041-3*  
*Second year, first semester* *Two hours per week*

An introductory course conducted mainly by graphical methods and dealing with gear trains, velocity ratios, paths of mechanical movements and their application to velocity diagrams, quick-return mechanisms, and cams.

PROFESSOR ASHLEY.

## SCHOOL OF ENGINEERING

### 044-3 MECHANISM

*Curriculum: II*

*Second year, second semester*

*Preparation: 044-2*

*Six hours per week*

A continuation of Mechanism 044-2, embracing a careful study of gear-tooth outlines.

PROFESSOR ASHLEY.

## GENERAL ENGINEERING

### 050-1 ENGINEERING CONFERENCE

*All curriculums*

*Third and fourth years:  
both semesters*

*Preparation: — —*

*Two hours per week*

The connecting link between the industry and the class room. The third and fourth-year men of each curriculum meet in four separate groups for nine of the ten meetings, during each period. Each student, in turn, gives a thirty to forty-five minute talk on some particular topic of engineering interest. This talk then becomes the subject of discussion by the whole class, and the problem is considered in as much detail as seems best to the instructor.

For the tenth meeting of each period all courses meet together in Bates Hall and hear some speaker on a technical subject of live interest to all engineering students.

The marks for the reports written each period while at work, and the marks for the individual talks, are averaged in due proportion to find the grade due the student.

PROFESSORS NIGHTINGALE, ALVORD, ZELLER, SMITH.  
AND STRAHAN.

### 052-1 THESIS

*All curriculums*

*Fourth year, both semesters*

*Preparation: Technical subjects*

*One hour per week*

Each student who is a candidate for graduation must, during his senior year, prepare and present a thesis, the satisfactory completion of which is a pre-requisite for receiving a degree from the School of Engineering. By "thesis" is meant an essay involving the statement, analysis, and solution of some problem in pure or applied science. Its purpose is to demon-

## PROGRAM OF STUDIES

strate a satisfactory degree of initiative and a power of original thought and work on the part of each candidate for an engineering degree.

The subject of the thesis is to be decided in conference between the candidate and that faculty member of the professional department to whom he is assigned for supervision in thesis work, final approval, however, resting with the head of the department. This subject may be one of structural design, research, testing, study of a commercial process, etc., but in no case would a mere resumé of prior knowledge and a discussion of the present state of the matter be acceptable. This, it is true, must normally be made, but in addition thereto there must be a certain amount of work planned and executed, aimed toward the extension of the present field of information as regards the subject chosen.

In many cases the student presents an individual thesis. However, in nearly equal number, acceptable subjects will be found necessitating the co-operation of at least two men, either of the same or sometimes of different professional departments. In such cases, each man is primarily responsible for a certain part of the work, while also making himself wholly familiar with the entire problem; and the completed thesis must show clear evidence of the evenly-balanced co-operation and labor of the men concerned.

The completed thesis will be examined for acceptance or rejection from the technical viewpoint by the professional departments interested, and then forwarded to the Dean's office, the final approval of the thesis resting with the Dean.

Upon acceptance, the thesis becomes the property of the School of Engineering, together with all apparatus and material used in connection therewith, except that hired or borrowed, or which was already the personal property of the candidate. It is not to be printed, published, nor in any other way made public except in such manner as the professional department and the Dean shall jointly approve.

For all further information, the candidate for the degree is referred to the "Directions for Theses," which he must obtain from his professional department at the beginning of his senior year.

## SCHOOL OF ENGINEERING

The arrangement of hours shown in the curriculums may be varied to suit the requirements of each department.

### PHYSICAL EDUCATION

#### 060-1 PHYSICAL TRAINING

<i>All curriculums</i>	<i>Preparation: — —</i>
<i>First year, both semesters</i>	<i>Two hours per week</i>

All first-year students are required to take Physical Training. Health, strength, and vitality do not come by chance, but by obedience to natural laws. It is very essential for the students to acquire good habits of life. The work in the gymnasium is of the body building type, with plenty of competition. Regular classes in calisthenics are held under an able physical instructor.

Students who are members of the varsity squads in any of the major sports may be excused from Physical Training upon petition to the Faculty, providing the petition is supported by the certification of the athletic coach and physical director. Upon petition of a student to be excused from Physical Training, owing to physical disability, favorable action will be taken by the Faculty only when said petition is accompanied by a physician's certificate, verifying the disability.

MR. SINNETT.

### DEPARTMENT OF CIVIL ENGINEERING

#### 11-1 SURVEYING

<i>Curriculum: I</i>	<i>Preparation: — —</i>
<i>First year, first semester</i>	<i>Two hours per week</i>

Lectures, recitations, and problem work in which the following subjects are considered: the chain, tape, compass, transit, and level, methods of making and computing both closed and random traverses, location of buildings and points.

PROFESSOR INGALLS.

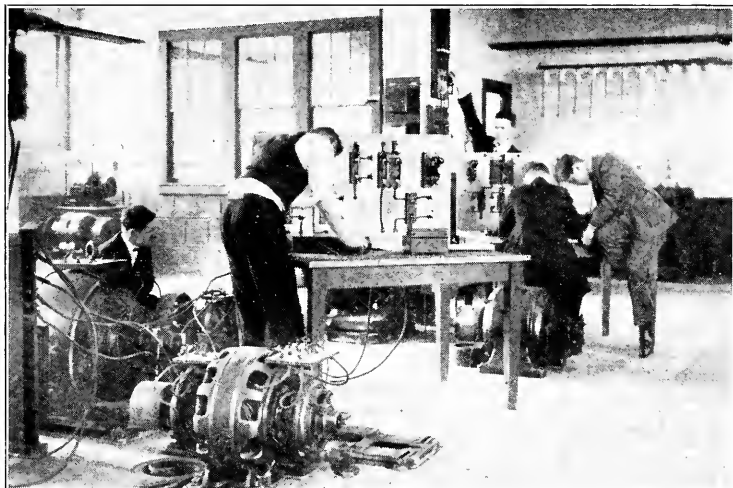
#### 11-2 SURVEYING

<i>Curriculum: I</i>	<i>Preparation: 11-1</i>
<i>First year, second semester</i>	<i>Two hours per week</i>

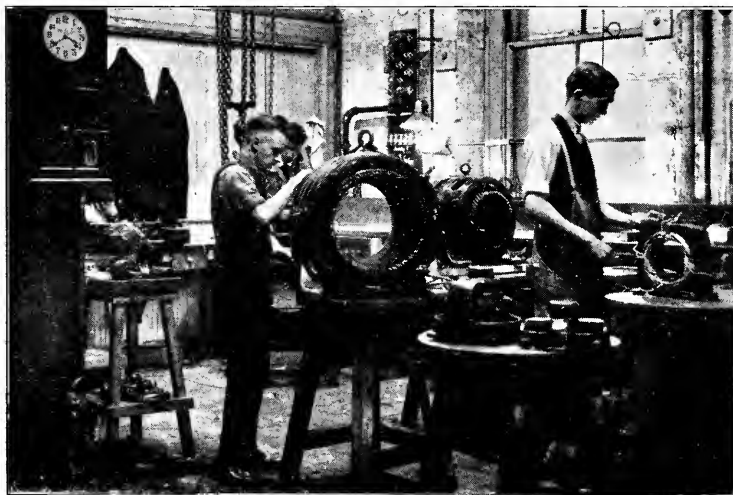
Surveying for deeds, city surveying, U. S. system of public land surveying, differential and profile leveling, theory and use of contour maps, stadia methods and various special problems.

PROFESSOR INGALLS.

# Electrical Engineering Students

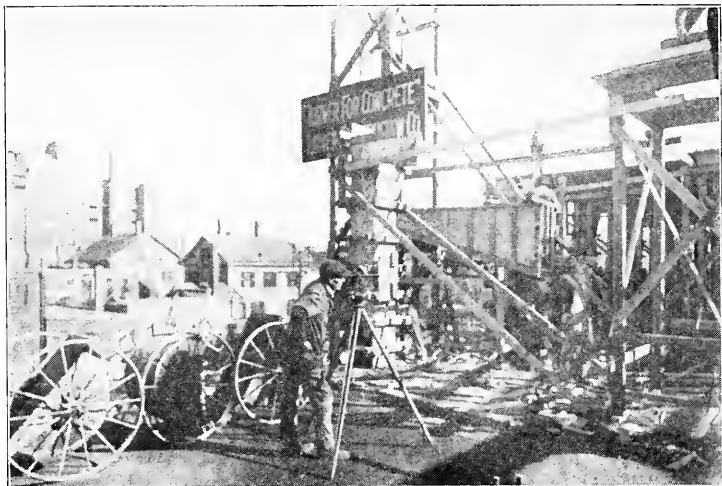


Test on a Rotary Converter  
Section in Electrical Laboratory  
Northeastern University

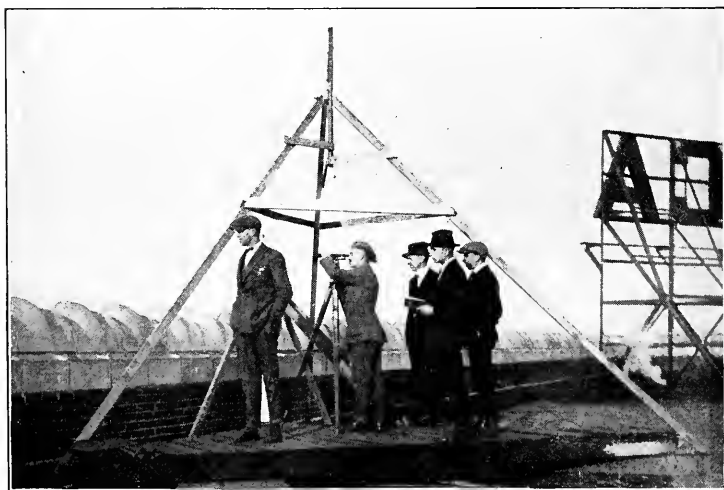


Rewinding Coils and Repair of Motors  
Electrical Installation Co., Boston

# Civil Engineering Students



Giving Lines and Grades  
Turner Construction Co., Boston



Triangulation Surveying  
Northeastern University

## PROGRAM OF STUDIES

### 11-3 SURVEYING: FIELD-WORK AND PLOTTING

*Curriculum: I*  
*First year, first semester*

*Preparation: 11-1*  
*taken concurrently*  
*Five hours per week*

Two afternoons per week are devoted to preliminary practise with the standard surveying instruments. The work depends upon, and is closely allied to, the theoretical work in Surveying 11-1. The student first practises taping and chaining, then learns to use the compass for reading magnetic bearings. Then there follows practice with the transit level, and tape, concluding with a large transit and tape closed traverse. This traverse is balanced, plotted, and completed as a map. This includes the location and plotting of streets, buildings, etc., included within the traverse. Work is done on contour maps, with problems; differential and profile leveling; stadia methods; and various special problems such as layout of line and grade for a sewer or a building.

PROFESSOR INGALLS, MR. BAIRD AND ASSISTANTS.

### 11-4 SURVEYING: FIELD-WORK AND PLOTTING

*Curriculum: I*  
*First year, second semester*

*Preparation: 11-2*  
*taken concurrently*  
*Five hours per week*

A continuation of Surveying 11-3.

PROFESSOR INGALLS, MR. BAIRD AND ASSISTANTS.

### 11-5 SURVEYING

*Curriculum: I*  
*Second year, first semester*

*Preparation: 11-2, 11-4*  
*Two hours per week*

The student is taught the theory of plane and geodetic triangulation, the theory of the sextant, the theory of plane table topographical surveying, the adjustments of instruments, and the methods of stellar observation for the determination of azimuth. Surveying problems in review of the elementary work are assigned to make sure that the student has a comprehensive and accurate knowledge of the art.

PROFESSOR INGALLS.

## SCHOOL OF ENGINEERING

### 11-6 SURVEYING: FIELD-WORK AND PLOTTING

*Curriculum: I*  
*Second year, first semester*

*Preparation: 11-5*  
*taken concurrently*  
*Five hours per week*

The work follows closely and is dependent upon the theoretical work of Surveying 11-5. Actual practice is given in triangulation, work with the sextant, plane table, field adjustment of instruments and in making an observation on polaris for latitude and azimuth.

PROFESSOR INGALLS.

MR. BAIRD.

### 12-1 RAILROAD SURVEYING

*Curriculum: I*  
*Second year, second semester*

*Preparation: 11-5, 11-6*  
*Three hours per week*

The course covers the principles and application of simple, compound, reversed, parabolic, and transition curves to railroad and highway location, also the principles of reconnaissance, preliminary and location survey for a railroad.

PROFESSOR INGALLS.

### 12-2 RAILROAD SURVEYING, FIELD-WORK AND PLOTTING

*Curriculum: I*  
*Second year, second semester*

*Preparation: 12-1*  
*taken concurrently*  
*Five hours per week*

The work follows closely the theory of Railroad Surveying 12-1. It includes the layout in the field of various railroad curves; the reconnaissance, preliminary and location survey of a line of railroad. Drafting room problems on location of railroads and highways are given.

PROFESSOR INGALLS AND ASSISTANTS.

### 12-3 RAILROAD ENGINEERING

*Curriculum: I<sub>1</sub>*  
*Third year, first semester*

*Preparation: 12-1, 12-2*  
*Two hours per week*

The work is a continuation of Railroad Surveying 12-1. Methods of computing excavation and embankment, including the use of tables, are studied in detail. Further study is devoted to the effect of haul, and the use of the mass diagram in the determination of the final location. The economics of railroad location are considered.

PROFESSOR INGALLS.

## PROGRAM OF STUDIES

### 12-4 RAILROAD ENGINEERING, FIELD-WORK AND PLOTTING

*Curriculum: I<sub>1</sub>*

*Preparation: 12-3  
taken concurrently*

*Third year, first semester*

*Five hours per week*

Field work in connection with Railroad Engineering 12-3. The final location and profile of the railroad line is plotted, including the vertical, horizontal, and transition curves. A mass diagram is drawn for the earthwork, and a final computation of cost is made. The line is cross-sectioned and slope-staked.

PROFESSOR INGALLS, MR. BAIRD AND ASSISTANTS.

### 13-1 HYDRAULICS

*Curriculums: I, II<sub>1</sub>*

*Preparation: 21-2*

*Third year, first semester*

*Three hours per week*

A study of the principles of both hydrostatics and hydrodynamics. The subjects considered are: the pressure on submerged areas together with their points of application; the laws governing the flow of fluids through orifices, short tubes, nozzles, weirs, pipe lines and open channels; and the dynamic action of water flowing over both stationary and moving curved surfaces. A short study of stream flow measurements is also included.

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### 13-2 HYDRAULIC MOTORS

*Curriculum: II<sub>1</sub>*

*Preparation: 13-1*

*Third year, second semester*

*Two hours per week*

Principles underlying the design of hydraulic turbines and motors. A complete study is also made of stream flow, storage and other details relating to hydraulic installations.

PROFESSOR ZELLER.

### 13-3 HYDRAULICS

*Curriculums: III, IV*

*Preparation: 21-2*

*Third year, second semester*

*Two hours per week*

Similar to Hydraulics 13-1, but adapted to the special needs of the students in these curriculums.

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## SCHOOL OF ENGINEERING

### 14-1 THEORY OF STRUCTURES

*Curriculum: I*

*Third year, second semester*

*Preparation: 21-3*

*Three hours per week*

Class and drawing-room work in studying the loads, reactions, shears, and moments acting upon structures of various kinds, such as roofs and bridges. A thorough study is also made of the various functions of the influence line; the methods used to determine the position of moving loads to produce maximum shears and moments on bridges; and the design of beams.

MR. GRAMSTORFF.

### 14-3 ENGINEERING STRUCTURES

*Curriculum: I*

*Fourth year, both semesters*

*Preparation: 14-1, 14-6*

*Six hours per week*

The computation and design of structures of wood, steel, and masonry by analytical and graphical methods. The subjects considered are: plate girders, roof and bridge trusses of various types, such as simple trusses, bridge trusses with secondary web systems—including Baltimore and Pettit trusses—and trusses with multiple web systems, lateral and portal bracing, transverse bents, viaduct towers, and cantilever bridges. A study is also made of the design of columns, tension members, pin and riveted truss joints, trestles of wood and steel, masonry dams, retaining walls, and arches. The student is also given training in the use of the standard handbooks in structural work. The object is to train the student thoroughly in the application of mechanics to the design of structure.

PROFESSOR ALVORD.

### 14-5 STRUCTURAL DRAWING

*Curriculum: I*

*Third year, first semester*

*Preparation: 041-1, 21-3*

*Three hours per week*

Drawing of standard sections of structural steel shapes and connections, and the preparation of drawings representing elementary structural details. The course is designed to familiarize the student with the drawing, dimensioning, and detailing of structural parts.

MR. GRAMSTORFF.

## PROGRAM OF STUDIES

### 14-6 STRUCTURAL DRAWING

*Curriculum: I*                      *Preparation: 14-5*  
*Third year, second semester*      *Three hours per week*

A continuation of Structural Drawing 14-5, but covering the designing and detailing of riveted connections. Short problems in design, typical of those met with in practice are analyzed.

MR. GRAMSTORFF.

### 14-7 STRUCTURAL DESIGN

*Curriculum: I*                      *Preparation: 14-3*  
*Fourth year, first semester*      *Six hours per week*

Designing and detailing of structures using the theory learned in Engineering Structures 14-3. Complete working drawings are ordinarily made of some structure of the type of a wooden roof truss or single track plate girder railroad bridge.

MR. GRAMSTORFF.

### 14-8 STRUCTURAL DESIGN

*Curriculum: I*                      *Preparation: 14-7*  
*Fourth year, second semester*      *Six hours per week*

Additional work is undertaken in the design and detailing of a simple structure such as a riveted truss, highway or railroad bridge.

MR. GRAMSTORFF.

### 15-1 CONCRETE

*Curriculum: I<sub>1</sub>*                      *Preparation: 21-3*  
*Fourth year, both semesters*      *Two hours per week*

Concrete as a material of construction is studied in detail, and the principles of reinforced concrete design are learned. Computations and designs are made of flat slabs, T beams, columns, footings, retaining walls, and arches.

PROFESSOR ALVORD.

### 15-2 CONCRETE DESIGN

*Curriculum: I<sub>1</sub>*                      *Preparation: 15-1,*  
*Fourth year, both semesters*      *taken concurrently*  
*Three hours per week*

Detailing and making of complete working drawings of the concrete structures designed in Concrete 15-1.

PROFESSOR ALVORD.

## SCHOOL OF ENGINEERING

### 15-3 CONCRETE

*Curriculum: II<sub>1</sub>*

*Fourth year, first semester*

*Preparation: 21-3*

*Two hours per week*

Concrete as a material of construction in general, with principles of reinforced concrete design.

PROFESSOR ALVORD.

### 16-1 MATERIALS

*Curriculums: I, II*

*Fourth year, first semester*

*Preparation: 21-3*

*Two hours per week*

A detailed study is made of the methods of manufacturing, properties, and uses of materials used in engineering work; such as iron and steel, lime, cement, concrete, brick, wood and stone. Methods of testing and strength of various materials used by the engineer are also taken up. Each student is required to prepare a paper on some subject of especial importance, which is assigned by the instructor.

MR. STEARNS.

### 16-2 TESTING MATERIALS LABORATORY

*Curriculum: I*

*Third year, second semester*

*Preparation: 21-3*

*Two hours per week*

The work is done by the students and includes tests to determine the elongation, reduction of areas, modulus of elasticity, yield point, ultimate compressive strength of metals, such as steel, cast iron, copper and brass; tensile and compressive tests on timber and concrete; tests to determine the deflection, modulus of elasticity, elastic limit, and ultimate transverse strength of steel and wooden beams, subject to transverse loads. Tests are also made on cement mortars to determine the strength of cubes and briquettes at different ages.

PROFESSOR ALVORD.

### 16-3 FOUNDATIONS

*Curriculum: I<sub>1</sub>*

*Fourth year, first semester*

*Preparation: 14-1, and 16-1  
taken concurrently*

*Two hours per week*

The subjects treated are pile formations—including those of timber and concrete—sheet piles, coffer-dams, box and open caissons, pneumatic caissons, pier foundations in open wells, bridge piers, and abutments.

MR. GRAMSTORFF.

## PROGRAM OF STUDIES

### 16-4 GEOLOGY

*Curriculum: I*  
*Third year, first semester*

*Preparation: — —*  
*Two hours per week*

Earth movements and the various terrestrial applications of solar energy. The more important geological processes, erosion, sedimentation, deformation, and eruption are taken up and discussed. The latter part of the course is devoted to lectures on the broader structural features of the earth's crust and the application of the principles of structural geology to practical engineering problems.

PROFESSOR ALVORD.

### 17-1 HIGHWAY ENGINEERING

*Curriculum: I<sub>1</sub>*  
*Fourth year, second semester*

*Preparation: 11-2*  
*Two hours per week*

The location, construction, and maintenance of roads, street design, and street drainage; sidewalks; pavement foundations; and the construction, cost and maintenance of the various kinds of roads and pavements, including asphalt, brick, stone-block, wood-block, macadam (both water bound and bituminous), bituminous concrete, hydraulic cement concrete, gravel, and earth. Special consideration is given to the modern concrete road.

PROFESSOR INGALLS.

## DEPARTMENT OF MECHANICAL ENGINEERING

### 21-1 APPLIED MECHANICS (STATICS)

*All curriculums*  
*Second year, first semester*

*Preparation 022-1, 031-1*  
*Four hours per week*

The topics covered are: forces in equilibrium, parallel forces, stresses in frames and forces in three dimensions. The student is required to solve a large number of problems and to pass examinations at frequent intervals. It is felt that the student should retain a considerable body of facts about this subject in his mind after graduation; therefore a thorough groundwork of theory is covered.

PROFESSOR BENEDICT,  
MESSRS. BAIRD AND STEARNS.

## SCHOOL OF ENGINEERING

### 21-2 APPLIED MECHANICS (KINETICS)

*All curriculums*

*Preparation: 21-1*

*Second year, second semester*

*Three hours per week*

A continuation of Applied Mechanics 21-1 covering center of gravity, moment of inertia, radius of gyration, kinematics of harmonic motion and pendulums, and kinetics of translation and rotation.

PROFESSOR BENEDICT,  
MESSRS. BAIRD AND STEARNS.

### 21-3 STRENGTH OF MATERIALS

*Curriculums: I, II*

*Preparation: 21-2*

*Third year, both semesters*

*Three hours per week*

The topics covered are: the theory and experimental basis of tension, compression, shear, resilience, modulus of elasticity, bending stresses, the design of beams, moment and shear diagrams, use of tables of standard steel shapes, longitudinal shear and deflection in beams, combined stresses, beams with three supports, columns, the strength of shafts and springs, and principal stresses.

PROFESSOR BENEDICT.

### 21-4 STRENGTH OF MATERIALS

*Curriculums: III, IV*

*Preparation: 21-1*

*Third year, first semester*

*Three hours per week*

Similar to Strength of Materials 21-3, but more limited in time. The topics omitted are columns, principal stresses, and longitudinal shear and deflection in beams.

PROFESSOR BENEDICT.

### 22-1 GRAPHICAL ANALYSIS

*Curriculum: II*

*Preparation: 04-3, 21-2*

*Third year, first semester*

*Six hours per week*

Many problems which may readily be solved by graphical methods are included here. Valve gear problems are solved by the use of the various diagrams. The kinematical features of various machines are studied by means of velocity and acceleration diagrams.

PROFESSOR FERRETTI.

## PROGRAM OF STUDIES

### 22-2 MACHINE DESIGN

*Curriculum: II*

*Preparation: 21-3*

*taken concurrently*

*Third year, second semester*

*Six hours per week*

An application of the principles studied in Applied Mechanics. The problem work of the course consists mainly in the design of a steam boiler as the stresses for such a design are known to a great degree of certainty, and the materials of construction are very reliable.

PROFESSOR FERRETTI.

### 22-3 MACHINE DESIGN

*Curriculum: II*

*Preparation: 22-2, 22-5*

*Fourth year, first semester*

*Six hours per week*

Further practice is given the student in the application of theoretical principles previously studied, and at the same time he becomes familiar with the many practical details which must be considered in design work. The problems taken up in the early part of the course are of a static nature, while the later problems involve dynamical stresses. The problems vary from year to year, but the following are typical of the designs taken up: hydraulic press, arbor press, hydraulic flanging clamp, crane, air compressor, punch and shear, stone-crusher, etc.

In each design, the constructive details are carefully considered, with special attention to methods of manufacture, provision for wear, lubrication, etc. The work is based on rational rather than empirical methods, the student being required to make all calculations for determining the sizes of the various parts and all necessary working drawings.

PROFESSOR FERRETTI.

### 22-4 MACHINE DESIGN

*Curriculum: II<sub>1</sub>*

*Preparation: 22-3*

*Fourth year, second semester*

*Six hours per week*

A continuation of Machine Design 22-3 with special reference to designs involving dynamical stresses. A thorough discussion of the principles and methods of lubrication forms a part of the course.

PROFESSOR FERRETTI.

## SCHOOL OF ENGINEERING

### 22-5 MECHANISMS OF MACHINES

*Curriculum: II,*

*Third year, second semester*

*Preparation: 044-3*

*Three hours per week*

Designed to supplement the work in pure mechanism as given in Mechanism 044-3, by a consideration of the application of mechanisms to actual machines, thereby furnishing the student with a series of practical mechanisms to accomplish definite purposes, and increasing his ability to analyze the action of other machines.

PROFESSOR FERRETTI.

### 23-1 HEAT ENGINEERING

*Curriculums: II*

*Third year, both semesters*

*Preparation: 023-2, 033-1*

*Three hours per week*

The fundamental principles underlying the subject of thermodynamics. A study is made of the following topics: the properties of perfect gases, saturated and super-heated vapors, air and steam cycles, and the flow of fluids through nozzles, and pipe-lines, and the calculations of an air compressor. In the second half-year the principles of thermodynamics are applied to the various parts of the modern steam power plant. This includes a study of boilers, fuels, and combustion, flue gas analysis, feed-water heaters, chimneys, steam engines, condensers, cooling towers, gas power, steam turbines, and also the methods of testing power plant equipment.

PROFESSOR FERRETTI.

### 23-2 ENGINEERING LABORATORY

*Curriculums: II, III*

*Fourth year: III, first semester*

*II, second semester*

*Preparation: 23-1 or 23-7*

*Two hours per week*

A short but selected series of experiments upon various appliances used in modern power plants to illustrate under actual conditions the principles developed in Heat Engineering 23-1. The students here apply the knowledge they have gained in the class room to actual tests, making a complete report of the experiment, including method of testing and calculations. The series consists of about eight or nine experiments of which

## PROGRAM OF STUDIES

the following may be mentioned as illustrative of the type of work:

Indicator Practice.	Steam Calorimeter.
Flow of steam.	Gas Engine Test.
Plain Slide Valve Setting.	Air Compressor.
Steam Engine Test.	Ford Engine.
Air Blower Test.	

Satisfactory completion of eight experiments is the minimum acceptable amount of work.

MR. STEARNS.

### 23-3 HEAT ENGINEERING

*Curriculum: I, IV*

*Preparation: 023-2, 033-1*

*Third year, second semester*

*Three hours per week*

The subject matter of heat engineering is presented to the students of civil and chemical engineering to meet their special needs.

PROFESSOR FERRETTI.

### 23-4 STEAM TURBINES

*Curriculum: II<sub>1</sub>*

*Preparation: 23-1*

*Fourth year, second semester*

*Two hours per week*

A study of the principles of the flow of fluids, kinetic effects, and thermodynamics with the steam turbine used as a current example. The fundamental differences in the principle of the different types of turbines; the field of application of the steam turbine; and the influence of high vacuum together with the condensing equipment developed for turbine work, are all given careful attention.

PROFESSOR ZELLER.

### 23-5 HEAT ENGINEERING

*Curriculum: II<sub>1</sub>*

*Preparation: 23-1*

*Fourth year, first semester*

*Three hours per week*

A discussion of the theory and application of mechanical refrigeration comprises the greater part of this course. Both the compression and absorption types of machines are considered. During the latter part of the course, the principles of heating and ventilation of buildings are investigated.

PROFESSOR FERRETTI.

## SCHOOL OF ENGINEERING

### 23-6 ENGINEERING LABORATORY

*Curriculum: II<sub>1</sub>*

*Fourth Year, both semesters*

*Preparation: 23-1*

*Two hours per week*

This course is more complete than Engineering Laboratory 23-2, including the ground covered in that course and, in addition, a boiler test in the Power Plant to determine the relative efficiencies of the boilers using coal and oil as fuel, and various other tests on power plant apparatus.

MR. STEARNS.

### 23-7 HEAT ENGINEERING

*Curriculum: III*

*Third year, both semesters*

*Preparation: 023-1, 033-1*

*Three hours per week*

This course is similar in many respects to Heat Engineering 23-1 but less time is devoted to theoretical discussion and the remaining time is spent in a consideration of the types of boilers, engines, and auxiliary equipment. The aim of the entire course is to familiarize the students with the theory and application of prime movers for electrical generation, having fuels as the basis of power.

PROFESSOR FERRETTI.

### 24-1 PRODUCTION ENGINEERING

*Curriculum: II*

*First year, first semester*

*Preparation: — —*

*Four hours per week*

A descriptive course intended to acquaint the student with the organization, methods, and equipment used in industrial plants engaged in quantity production. For purposes of discussion the plant is divided into its various units: such as general offices, drafting-room, pattern-shop, foundry, machine-shop, erecting shop, testing-room, etc. The mechanical equipment, filing systems, cost-keeping systems, "follow-up" cards, etc., are described, and representative examples are shown.

PROFESSOR ZELLER.

### 24-3 POWER PLANT EQUIPMENT

*Curriculum: II<sub>1</sub>*

*Third year, first semester*

*Preparation: 23-1*

*taken concurrently*

*Two hours per week*

Largely a description of the many appliances used in modern power plants. A discussion of boilers and boiler accessories,

## PROGRAM OF STUDIES

ash and coal handling systems, the various types of engines—gas engines and turbines—with their valve gears and governing devices, condensers, feed-water heaters, pumps, etc.

PROFESSOR ZELLER.

### 24-4 POWER PLANT ENGINEERING

*Curriculum: II*

*Preparation: 23-1, 24-3*

*Fourth year, second semester*

*Three hours per week*

Topics and problems chosen largely from engineering practice selected to convey to the engineering students a firm grasp of fundamental principles and engineering methods of attacking and analyzing problems in power plant, not only from the point of view of scientific theory, but also with due consideration of the limitations imposed by practice and by costs. Efficiency and operation costs of different types of plants such as steam, hydro-electric and Diesel engines are also carefully studied to determine the type of plant best suited for the conditions and location involved.

PROFESSOR ZELLER.

### 24-6 STANDARD ENGINEERING PRODUCTS AND PROCESSES

*Curriculums: II, III*

*Preparation: 16-1*

*Fourth year, second semester*

*Two hours per week*

Intended to familiarize the student with the commercial names and sizes of engineering products: such as, bar and plate stock, shafting, tubing, pipes, valves, bearings and hangers, belts, pulleys, etc. A discussion of such manufacturing processes as extrusion, broaching, press work, electric and oxy-acetylene welding, cold and hot rolling and drawing, etc., is included.

PROFESSOR ZELLER.

### 25-1 INDUSTRIAL PLANTS

*Curriculum: II*

*Preparation: 21-2, 24-1*

*Fourth year, first semester*

*Four hours per week*

*second semester*

*Six hours per week*

The principles involved in the erection, installation, and management of an industrial plant. A description of the different types of structures, with consideration of such details

## SCHOOL OF ENGINEERING

as foundations, walls, columns, floors, windows, etc., is followed by a discussion of the installation of the power plant and machinery. A discussion of illumination, fire-prevention, heating and ventilation, routing of materials, and the organization and management of a plant are taken up. Design problems are given in connection with the course.

PROFESSOR ZELLER.

## DEPARTMENT OF ELECTRICAL ENGINEERING

### 30-1 APPLIED ELECTRICITY I

*Curriculum: I, II, IV*  
*Second year, first semester*

*Preparation: 022-1, 031-1*  
*Three hours per week*

The foundation for subsequent electrical engineering work for students of Civil, Mechanical, and Chemical Engineering. Emphasis is laid on the fundamental principles, and the subject is developed by elaborating these principles through numerical applications. The topics discussed during the first period are, briefly: magnets, and magnetism, electric resistance and Ohm's law, electric work and power, series and parallel circuits, Kirchhoff's laws, electro-magnetism, electro-magnetic induction, magnetic properties of iron, electrolysis and batteries. During the second period, the course varies somewhat in content, depending upon the particular branch of engineering which the students in the class are studying. In any case, time is devoted to a consideration of various direct current machines and appliances, their characteristics and applications.

MR. PORTER.

### 30-3 APPLIED ELECTRICITY II

*Curriculum: I, II, IV*  
*Second year, second semester*

*Preparation: 30-1*  
*Three hours per week*

The object is to fit the student to handle intelligently A. C. electrical problems that are likely to come up in connection with his chosen field. The topics discussed during the first period are, briefly: Alternating currents and voltages, inductance, capacitance; and circuits containing resistance, induc-

## PROGRAM OF STUDIES

tance and capacitance. In the second period, time is devoted to a consideration of various alternating current machines and appliances; their characteristics and application.

MR. PORTER.

### 30-4 APPLIED ELECTRICITY LABORATORY

*Curriculums: I, II*

*Preparation: 30-3*

*Second year, both semesters*

*Three hours per week*

The characteristics and operation of direct and alternating current machinery, discussed in course 30-3. The experiments deal with the following: resistance measurement, speed control direct-current motors; voltage control of generators; voltage regulation of direct-current generators; speed regulation of direct-current motors; brake tests of various types of direct and alternating-current motors; measurement of losses and the calculating of the efficiency of motors and generators; alternating current circuits containing resistance, inductance, and capacitance; determination of the characteristics of transformers; various polyphase connections; regulation of alternators; synchronous motor, rotary converter, and induction motor characteristics. A written report is required on each experiment, and especial care is exercised that such reports be correct in manner and in form.

MR. PORTER.

### 32-1 ELECTRICAL ENGINEERING I

*Curriculum III*

*Preparation: — —*

*First year, first semester*

*2 hours per week*

*second semester*

*3 hours per week*

A study in detail of the electric current, electromotive force and resistance, electrical work and power, electrical circuits, Kirchoff's laws, primary and secondary batteries, magnetism, electromagnetism, electromagnetic induction, self and mutual inductance, electrostatics, energy stored in the electromagnetic and electrostatic field. The practical units of measurement are discussed, as the several quantities to which they apply are successively reached. This is the fundamental electrical course of the curriculum and covers the matters usually taken up in a course of college physics, but in a more thorough manner and rather more from an engineering standpoint.

MR. PORTER.

## SCHOOL OF ENGINEERING

### 32-3 ELECTRICAL ENGINEERING II

*Curriculum: III*  
*Second year, both semesters*

*Preparation: 022-1, 32-1*  
*Three hours per week*

A careful, though more or less descriptive, discussion of the dynamo in general operating both as generator and motor, armature windings, armature reactions and their compensation, commutation, etc., followed by a thorough study of the direct-current machine from the point of design, during the first semester; and, during the second semester, a consideration of the methods of testing for efficiency and performance followed by some examination of the applications of the machines studied, as, parallel operation, three-wire systems, boosters and balancers, special motor application and control methods. Much emphasis is placed upon the working out of practical problems.

PROFESSOR SMITH.

### 32-4 ELECTRICAL ENGINEERING II, LABORATORY

*Curriculum: III*  
*Second year, both semesters*

*Preparation: 32-3,*  
*taken concurrently*  
*Six hours per week*

A carefully selected series of experiments intended to exemplify qualitatively, and in the clearest manner, the principles developed in the parallel lectures, 32-3. It includes a series of about twenty experiments, of which the following may be mentioned as illustrative of the type of work:

The starting of a shunt motor, and starting devices.

The speed, field, and voltage relations in a separately excited machine.

The heat test of a generator.

The characteristic curves of generators.

The parallel operation of shunt and compound generators.

The three-wire balancer set.

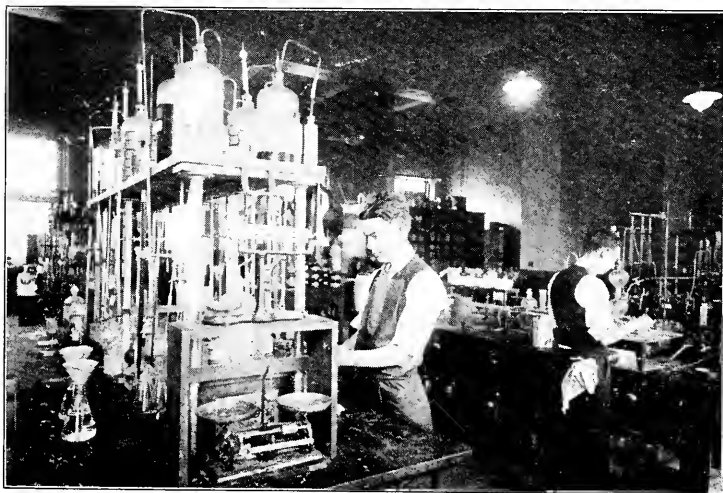
The speed and torque curves of the series motor.

Satisfactory completion of fifteen experiments is the minimum acceptable amount of work.

# Chemical Engineering Students



Analyzing Metals  
General Electric Company, Lynn

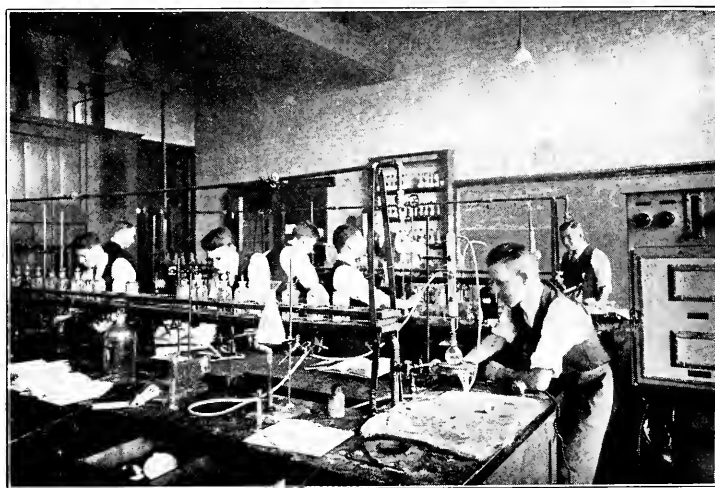


Analyzing Soap  
Lever Bros., Cambridge

## Students in Class Work



Making a Plane Table Survey  
Class in Surveying Fieldwork



Class in Organic Chemistry  
Northeastern University

## PROGRAM OF STUDIES

Since the purpose of the course is in part to develop correct methods of work, it is intended that the whole of the preparatory work, as well as the working up of the data obtained, shall be done in the laboratory under supervision of the instructor, so far as necessary.

PROFESSOR KINGSLEY.

MR. PORTER.

### 32-6 ELECTRICAL ENGINEERING III, LABORATORY

*Curriculum: III*

*Preparation: 32-4 and 32-7 and  
33-1, taken concurrently*

*Third year, both semesters*

*Six hours per week*

A series of experiments involving the testing of machines; together with experiments intended to elucidate practically the principles developed in the parallel course on alternating currents, 32-7, and also to train the student in the use of the special types of instruments which he will later use in laboratory work upon alternating current machinery.

Illustrative experiments are:

Stray power tests, Prony brake tests, retardation tests, pumping back tests, regulation tests, heat runs, analysis of losses, etc.

Study of A-C series and parallel circuits, resonant conditions, effect of frequency change on circuit constants, parallel operation of A-C machines, synchronizing and changing load, power factor measurements, power measurement in polyphase circuits, etc.

As the course progresses, the student is thrown more and more upon his own resources; a desired result is stated to him, and he is left to plan out his own methods, settle upon the apparatus needed, solve his precision requirements, calibrate the instruments, if necessary, and finally turn in a detailed report covering all phases of the work from its inception.

MR. RICHARDS.

### 32-7 ELECTRICAL ENGINEERING III

*Curriculum: III*

*Preparation: 023-2, 32-3*

*Third year, both semesters*

*Three hours per week*

## SCHOOL OF ENGINEERING

Lectures, recitations and problem work upon the electro-magnetic and electro-static fields and the theory of alternating currents. The course covers the consideration of the "steady state," both when we have a pure sine wave and when we have a complex wave. Transients are not considered. The subject is developed principally by the aid of vector algebra, and the student is urged to use the methods of complex quantity to the fullest extent.

Application of the principles developed to all possible combinations of resistance, inductive and condensive reactances in both single and polyphase circuits is given by the working of about two hundred problems involving both analytical and graphical methods.

PROFESSOR SMITH.

### 32-8 ELECTRICAL ENGINEERING IV, LABORATORY

*Curriculum: III*

*Fourth year, both semesters*

*Preparation: 32-9,*

*taken concurrently*

*Six hours per week*

Laboratory course to accompany Course 32-9 in alternating-current machinery. The work includes tests on the heating, efficiency, and determination of the characteristics of the various types of alternating-current machinery, such as transformers, generators, and motors. A detailed preliminary study is made of each assigned experiment, involving the theoretical principles, the method of procedure to obtain the required results, and the way in which the results should be worked up. This is embodied in a preliminary report. The student then does the necessary laboratory work to obtain the required data; and finally works up the whole into a detailed final report. The assistance given by the instructor is reduced to a minimum, the initiative and resourcefulness of the student being depended on to the greatest extent.

MR. RICHARDS.

### 32-9 ELECTRICAL ENGINEERING IV

*Curriculum: III*

*Fourth year, both semesters*

*Preparation: 32-7*

*Four hours per week*

A careful, thorough, and detailed discussion of the construction, theory, operating characteristics, and testing of the

## PROGRAM OF STUDIES

various types of alternating current machinery. The first half of the course is equally divided between the transformer and the synchronous generator. In the second half of the course synchronous motors, parallel operation of alternators, synchronous converters, polyphase induction motors, the induction generator, single phase induction motors, and commutating alternating-current motors are taken up. One two-hour period a week is spent in the solution of numerical problems.

MR. RICHARDS.

### 33-1 ELECTRICAL MEASUREMENTS

*Curriculum: III*

*Third year, both semesters*

*Preparation: 32-3*

*Two hours per week*

A brief discussion of measurement in general and electrical measurements in particular, in which a review of the electrical units and their definitions has a part. Resistance devices, galvanometers, ammeters, and voltmeters are next discussed, the treatment of other instruments being taken up later in connection with their uses. This is followed by a detailed discussion of the methods of measuring the various electrical quantities—resistance, resistivity, conductivity, current, electromotive force, capacitance, inductance, magnetic induction, permeability, hysteresis loss, energy, and power. The student is given a thorough discussion of the construction, theory of operation, method of use, sources of error, etc., of the types of measuring instruments used in commercial work and in the standardizing laboratory.

PROFESSOR KINGSLEY.

### 33-2 ELECTRICAL MEASUREMENTS LABORATORY

*Curriculum: III*

*Third year, second semester*

*Preparation: 33-1*

*Three hours per week*

A series of experiments emphasizing the principles developed in Course 33-1. The student becomes familiar with the use of the standard apparatus in use in testing laboratories. Particular stress is laid on the correct use of the apparatus, and precision discussions are required throughout.

The experiments cover such matters as the measurement of resistance by various methods, resistivity, conductivity,

## SCHOOL OF ENGINEERING

electromotive force, current inductance, capacitance, magnetic induction, magnetizing force, hysteresis loss, etc., in cable testing, magnetic testing, wave form determination, and the use of special apparatus.

Thorough training in the principles of precision of measurements is also given, and applied to each experiment performed.

PROFESSOR KINGSLEY.

### 33-4 ADVANCED STANDARDIZING LABORATORY

*Curriculum: III*

*Preparation: 33-2*

*Fourth year, first semester*

*Three hours per week*

This laboratory course is given over to the use of Laboratory and Secondary standards, and precision methods as applied to checking resistances, calibration of instruments of various types including the checking of the instruments used in the other laboratory courses.

It involves the use of the potentiometer, Weston Laboratory Standard Instruments; Standard Wheatstone, Kelvin Low Resistance & Carey-Foster bridges, etc.

Precision work is insisted on throughout, and while the student is trained to develop speed and quickness of manipulation this is never at the expense of quality and accuracy of the work.

PROFESSOR KINGSLEY.

PROFESSOR SMITH.

### 34-1 ELECTRICAL ENGINEERING V

*Curriculum: III*

*Preparation: 32-9*

*Fourth year, both semesters*

*taken concurrently*

*Four hours per week*

This course is divided into two parts carried along parallel to each other.

a; A detailed study of the central station, both steam and hydro-electric, attention being given to both engineering and economic details, the influence of each upon the cost of power being kept always in view. Following this is a careful study of the high tension transmission line, potentials used, spacing, line characteristics, losses transient phenomena, etc. Finally the substation and its equipment is considered.

## PROGRAM OF STUDIES

b; The subject is taken up with the power delivered to the substation distributing busses, and the matter of its utilization discussed, taking up electric railways, exterior and interior illumination, motor application in various branches of industry and the study of the National Electrical and National Safety Codes.

PROFESSOR KINGSLEY.

PROFESSOR SMITH.

### 35-1 ADVANCED ELECTRICITY

*Curriculum: III*

*Fourth year, both semesters*

*Preparation: 32-7, 33-1*

*Two hours per week*

The course is given over to a full discussion of modern electrical theory, the development is traced from Faraday through the work of, Kelvin, Maxwell and Herz on the one hand, and that of Crookes, Thomson, Millikan, etc., on the other. The subjects of ionization, ionizing radiations, metallic, electrolytic and gaseous conduction, electromagnetic mass, electrical constitution of matter are discussed together with the matter of electromagnetic radiation, the propagation of waves along wires and through space; and the principles of the thermionic valve in its various forms.

PROFESSOR SMITH.

## DEPARTMENT OF CHEMICAL ENGINEERING

### 40-1 INORGANIC CHEMISTRY

*Curriculum: I\*, II\*, III*

*First year, first semester*

*Preparation: — —*

*Four hours per week*

Inorganic chemistry designed to meet the needs of students in non-chemical courses. A brief discussion of the general principles of chemistry as applied to engineering, with the idea of illustrating the applications of chemistry to special lines of engineering work.

PROFESSOR STRAHAN.

MR. BAKER.

### 41-1 INORGANIC CHEMISTRY

*Curriculum: IV*

*First year, both semesters*

*Preparation: — —*

*Four hours per week*

The fundamental principles of the science are taught by means of experimental lectures. Topics of a broad general

\*Third year, second semester.

\*\*First year, second semester.

## SCHOOL OF ENGINEERING

character are taken up in the first part of the subject, in connection with the descriptive chemistry of the non-metallic elements, followed later by more specialized work in connection with the elements. Recitations will include a short written test on the two lectures of the week. Special attention is given to chemical calculations based on practical application.

PROFESSOR STRAHAN.

### 41-2 INORGANIC CHEMISTRY LABORATORY

*Curriculum: IV*

*Preparation: 41-1*

*taken concurrently*

*First year, both semesters*

*Five hours per week*

The object is to cultivate scientific attitude and habit of thought on the part of the student, and to increase his power of acquiring knowledge, whether it be from book, lecture, or from experiment. The experiments are planned to illustrate the topics which have been discussed in the lecture room. Careful manipulations, thoroughness in observation, accuracy in arriving at conclusions, are required of each student. In this, as in all subsequent laboratory work, neat and satisfactory notes will be considered an essential part of the work.

PROFESSOR STRAHAN.

MR. BAKER.

### 42-1 QUALITATIVE ANALYSIS

*Curriculum: IV*

*Preparation: 41-1*

*First year, summer term*

*Ten hours per week*

The course is designed not merely to consider the procedures used in the detection of the common elements, but to deal in a much broader way with the principles involved in chemical analysis and to broaden the student's knowledge of inorganic chemistry, especially the chemistry of the metallic elements. A great deal of time is devoted to the study of the principles of hydrolysis, solubility product, correct concentration, amphoteric substances, and the general laws of solutions. In the latter part of the course the analysis of unusual mixtures will be discussed with especial emphasis on the interpretation of analytical results.

MR. PERKINS.

## PROGRAM OF STUDIES

### 42-2 QUALITATIVE ANALYSIS LABORATORY

*Curriculum: IV*

*Preparation: 42-1*

*taken concurrently*

*First year, summer term*

*Twenty-eight hours per week*

After a series of preliminary experiments illustrating principles and giving opportunity for practice in writing equations, the analysis of unknown substances is undertaken, beginning with solutions and simple salts, and later analyzing minerals, pigments, slags, alloys, and various commercial products, such as boiler compounds, cleaning powders, glass enamels, and similar inorganic substances.

MR. PERKINS.

### 43-1 QUANTITATIVE ANALYSIS

*Curriculum: IV*

*Preparation: 42-1, 42-2*

*Second year, first semester*

*Two hours per week*

The general principles of quantitative analysis. Half of the time is devoted to the consideration of typical methods in gravimetric analysis, such as the determination of chloride in salt, the determination of sulphur in sulphur compounds, the complete analysis of brass, and other analyses involving general principles of procedure. The other half of the time is devoted to the methods of volumetric analysis as illustrated in the use of acid and alkali determinations, oxidation methods involving bichromate, permanganate and iodine, and the methods of volumetric precipitation. Special attention is given to chemical calculations, and the solution of numerous analytical problems is one of the essential features of the course.

MR. PERKINS.

### 43-2 QUANTITATIVE ANALYSIS LABORATORY

*Curriculum: IV*

*Preparation: 43-1*

*Second year, both semesters*

*taken simultaneously*

*Five hours per week*

Analytical practice illustrating the methods discussed in Course 43-1. The calibration of burettes, the use and care of analytical balances, and a limited number of typical gravimetric and volumetric analyses are included in the course, in which great stress is laid on the accuracy, care, and integrity necessary for successful quantitative work.

MR. PERKINS.

## SCHOOL OF ENGINEERING

### 44-1 TECHNICAL ANALYSIS

*Curriculum: IV*

*Third year, first semester*

*Preparation: 43-1, 43-2*

*Three hours per week*

A continuation of course 43-1, dealing more specifically with actual technical or commercial analytical problems. Especial emphasis is placed upon actual methods used in industrial operations. Complete reports covering the history, theory, and actual routine work will be asked for from each student, upon each problem undertaken. In general, the course will include the rapid methods of analysis of steel, the analysis of boiler waters, gases, fuels, oils, paints, varnishes, and similar substances.

MR. PERKINS.

### 44-2 TECHNICAL ANALYSIS LABORATORY

*Curriculum: IV*

*Third year, first semester*

*Preparation: 44-1,*

*taken concurrently*

*Five hours per week*

Designed to illustrate by a limited number of analyses the technical methods of quantitative analysis. Problems will be assigned individually, depending on the student's future plans or his inclination, and will be selected from the fields of steel analysis, gas and fuel analysis, including calorific testing, water analysis. Time is devoted to the study of pigments, soaps, or in general in the analysis of that class of materials in which the student is most interested.

MR. PERKINS.

### 44-3 TECHNICAL ANALYSIS

*Curriculum: IV*

*Third year, second semester*

*Preparation: 44-1*

*Two hours per week*

This course is designed to cover in a brief manner the subject of metallography. The metallographic methods of investigation, including preparation of sample, etching, and microscopic examination will be discussed. A discussion of the more common non-ferrous alloys including bearing metals, type metals, solders, and brass will be undertaken by the interpretation of their temperature, composition diagrams and application to the Phase Rule. A portion of the time will also be devoted to the

## PROGRAM OF STUDIES

iron-carbon diagram, which will include the metallurgy and metallography of cast iron, malleable iron, carbon steels, and special steels.

MR. PERKINS.

### 45-1 ORGANIC CHEMISTRY

*Curriculum: IV*

*Third year, both semesters*

*Preparation: 43-1 and 43-2,  
taken concurrently*

*Three hours per week*

The underlying principles and theories of organic chemistry, the methods of preparation and characteristic reactions of carbon compounds. The important organic compounds will be considered in detail, because they serve as the most convenient examples for illustrating fundamental principles which elucidate the chemical character of substances which are of practical importance.

PROFESSOR STRAHAN.

### 45-2 ORGANIC CHEMISTRY LABORATORY

*Curriculum: IV*

*Third year, both semesters*

*Preparation: 45-1,  
taken concurrently*

*Five hours per week*

The operations, apparatus, and the laboratory technique involved in organic work, such a fractional distillation, extraction, crystallization, steam distillation, determinations of melting points, boiling points, and the like. It deals also with general methods of preparation, such as etherification, saponification, sulphonation, diazotization, etc. The student will prepare a number of compounds—including nitro-benzene, aniline, ethers, phenols, and other typical organic substances.

PROFESSOR STRAHAN.

### 45-3 ORGANIC CHEMISTRY

*Curriculum: IV*

*Fourth year, both semesters*

*Preparation: 45-1*

*Two hours per week*

A review of Course 45-1 is given, but the subject is studied from a more mature point of view to furnish the student a more thorough survey of the fundamental principles which underlie the modern developments in this branch of chemistry.

Emphasis is placed on the effect of the nature of organic radicals on the properties of the compounds containing them,

## SCHOOL OF ENGINEERING

the effect of unsaturation, and the influence of structure and substituents on the activity of groups and the laws of substitution.

Industrially important compounds are treated more at length than those of a more purely scientific use and of interest to the advanced students only.

During the latter part of the course outside reading will be assigned in the scientific journals, followed by reports and discussions.

PROFESSOR STRAHAN.

### 45-4 ORGANIC CHEMISTRY LABORATORY

*Curriculum: IV*

*Preparation: 45-3,  
taken concurrently*

*Fourth year, both semesters*

*Five hours per week*

Preparations and reactions of the typical organic substances, including the methods of separation and identification of simple mixtures. The instruction also includes a study of the qualitative tests for the important groups occurring in organic compounds, together with the other physical data which would give valuable information as to the nature of the compound under examination.

The student is given several unknown pure compounds and mixtures to analyze which trains him to use his head as well as the information supplied in his text-books.

PROFESSOR STRAHAN.

### 46-2 CHEMICAL ENGINEERING

*Curriculum: IV*

*Third year, second semester*

*Preparation: 13-3 and 23-3,  
taken concurrently and 43-1  
Two hours per week*

The study of basis principles such as the Law of Conservation of Elements, the Law of Conservation of Energy, and the Stoichiometrical Relationships of Solids and Gases. It is desired by the correlation of theoretical principles in the form of industrial plant problems to enlarge the viewpoint of the student and prepare him for Chemical Engineering 46-3.

MR. BAKER.

## PROGRAM OF STUDIES

### 46-3 CHEMICAL ENGINEERING

*Curriculum: IV*

*Fourth year, both semesters*

*Preparation: 46-2*

*Three hours per week*

A continuation of the study of the principles underlying the mechanical operations involved in chemical industries, together with a study of the apparatus used to perform these operations. The subjects of crushing and grinding, separation, flow of heat, flow of fluids, evaporation, distillation, and drying, are considered in detail, accompanied by the solution of typical problems of a chemical engineering nature.

MR. BAKER.

### 47-1 INDUSTRIAL CHEMISTRY

*Curriculum: IV*

*Fourth year, first semester  
second semester*

*Preparation: 44-1, 45-2*

*Three hours per week  
Two hours per week*

The more important industrial processes are studied with a view to the general chemistry involved and to the various types of apparatus necessary to carry out the chemical reactions. The student is given a broad survey of the field of chemical industry and a knowledge of the relationships of the different industries to one another. The industries studied include the production of acids, alkali, fertilizers, glass, pigments, cements, soap, explosives, paper, petroleum, illuminating gas and other general chemicals.

MR. BAKER.

### 47-2 INDUSTRIAL CHEMISTRY LABORATORY

*Curriculum: IV*

*Fourth year, both semesters*

*Preparation: 47-1,*

*taken concurrently  
Four hours per week*

The quantitative study of the preparation and purification of a small number of chemical products, selected as types of reactions of industrial importance. The processes employed are carefully controlled, and the final products are analyzed to determine their purity. When the work is completed, a careful detailed report of each process is made and discussed in class.

MR. BAKER.

## SCHOOL OF ENGINEERING

### 48-1 PHYSICAL CHEMISTRY

*Curriculum: IV*

*Fourth year, both semesters*

*Preparation: 42-1, 43-1, 44-1*

*Four hours per week*

The more important principles of Theoretical Chemistry are treated with great thoroughness and are illustrated by applying them to a large number of problems. During the course the following subjects are considered: derivation of molecular and atomic weights, derivation of formulae, properties of substances in the gaseous state, laws of solution, solutions of mixed substances, equilibrium of homogenous systems, kinetics of reactions, phase rule diagrams, and thermochemistry.

MR. PERKINS.

## DEPARTMENT OF ADMINISTRATIVE ENGINEERING

### 50-1 INDUSTRIAL ORGANIZATION

*Curriculums: I<sub>2</sub>, II<sub>2</sub>*

*Third year, second semester*

*Preparation: — —*

*Two hours per week*

This course takes up the types of business organization, including the individual enterprise, the partnership, the corporation, the joint stock company, and the legal trust. A study is made of the advantages of combinations and the effect of legal regulations.

PROFESSOR BENEDICT.

### 50-2 INDUSTRIAL FINANCE

*Curriculums: I<sub>2</sub>, II<sub>2</sub>*

*Third year, second semester*

*Preparation: 50-1*

*Two hours per week*

A continuation of Industrial Organization 50-1, with the addition of problems of promotion, underwriting, and general financing, common to all types of business.

PROFESSOR BENEDICT.

### 50-4 BUSINESS MANAGEMENT

*Curriculums: I<sub>2</sub>, II<sub>2</sub>*

*Fourth year, first semester*

*Preparation: 50-2*

*Three hours per week*

The course consists of discussions and problems in physical arrangements of manufacturing plants and office management as related to production.

PROFESSOR ROLLAND.

## PROGRAM OF STUDIES

### 50-6 BUSINESS ADMINISTRATION

*Curriculum: I<sub>2</sub>, II<sub>2</sub>*

*Fourth year, second semester*

*Preparation: 50-4*

*Three hours per week*

A study of the operation of manufacturing enterprises for profit. The details of the manufacturing departments, including time study and rate setting, together with related functions of employment, stores control, and shipping are taken up in detail.

PROFESSOR ROLLAND.

### 50-7 INDUSTRIAL ORGANIZATION

*Full-time curriculum*

*Second year, first term*

*Preparation: — —*

*Three hours per week*

The course takes up the types of business organization, including the individual enterprise, the partnership, and the corporation. A study is made of the advantages of combinations and the effect of legal regulations, and problems of promotion and underwriting.

PROFESSOR BENEDICT.

### 50-8 BUSINESS ADMINISTRATION I

*Full-time curriculum*

*Third year, first term*

*Preparation: — —*

*Three hours per week*

This course gives a broad view of the entire field of business organization and administration, and should be taken before the student takes the more specialized courses. The organization and promotion of industrial enterprises is considered. A study is made of such problems as the location of the establishment, the layout of the plant, buildings and equipment, power, administrative principles, the employment of labor and wage payment systems.

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### 50-9 BUSINESS ADMINISTRATION II

*Full-time curriculum*

*Third year, second term*

*Preparation: — —*

*Three hours per week*

This course involves a study of the office departments and their functions. This includes a study of the buying and the

## SCHOOL OF ENGINEERING

storing of raw materials, and of the sales organization for the disposal of the manufactured product.

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### 50-10 BUSINESS MANAGEMENT

*Full-time curriculum*

*Preparation: — —*

*Third year, third term*

*Three hours per week*

This course is a more specialized course than Business Administration. A thorough study is made of the general principles of management, office organization, co-ordination of the work in the office and in the shop, standardization of conditions in the office and in the shop, of equipment, and of wages, control of labor, industrial betterment, etc.

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### 51-1 PRINCIPLES OF ACCOUNTING

*Curriculums: I<sub>2</sub>, II<sub>2</sub>*

*Preparation: — —*

*Third year, first semester*

*Three hours per week*

The intention is not to train the student to be a professional bookkeeper or auditor, but to promote an understanding of financial reports. Problems are given in double-entry bookkeeping, debits and credits, balance sheets, and profit and loss statements.

PROFESSOR ROLLAND.

### 51-3 PRINCIPLES OF ACCOUNTING I

*Full-time curriculum*

*Preparation: — —*

*Second year, first term*

*Three hours per week*

This is an introductory course to accounting and hence is a prerequisite for all other accounting courses. The aim in this course is to teach the fundamental principles of bookkeeping. This involves a study of the underlying principles of debits and credits, journalizing, posting to the ledger, and the preparation of the trial balance, profit and loss statement, financial statement, and the balance sheet.

PROFESSOR ROLLAND.

### 51-4 PRINCIPLES OF ACCOUNTING II

*Full-time curriculum*

*Preparation: 51-3*

*Second year, second term*

*Three hours per week*

A continuation of 51-3 Principles of Accounting I.

PROFESSOR ROLLAND.

## PROGRAM OF STUDIES

### 51-5 COST ACCOUNTING

*Full-time curriculum*

*Second year, third term*

*Preparation: 51-4*

*Three hours per week*

The purpose of this course is to teach the student the principles underlying cost systems used in manufacturing and business enterprises.

By means of lectures and laboratory work the student is taught the use of cost systems as a basis for determining the cost of production of the commodities manufactured, as a means of determining the relative importance of the elements of such cost, and as a method of discovering waste and inefficiency and of securing standardization of men, machines, and equipment.

PROFESSOR ROLLAND.

### 52-1 BANKING AND SECURITIES

*Curriculums: I<sub>2</sub>, II<sub>2</sub>*

*Third year, second semester*

*Preparation: — —*

*Three hours per week*

Some of the topics considered are: national banks, trust companies, savings banks, clearing houses, loans, the money market, foreign exchange, securities, the construction of bond tables, sinking fund calculations, stock and produce exchanges.

PROFESSOR ROLLAND.

### 52-2 BANKING

*Full-time curriculum*

*Second year, third term*

*Preparation: — —*

*Three hours per week*

Some of the topics considered are national banks, trust companies, savings banks, clearing houses, loans, the money market, foreign exchange, securities, the construction of bond tables, sinking fund calculations, stock and produce exchanges.

PROFESSOR BENEDICT.

### 52-3 INDUSTRIAL FINANCE

*Full-time curriculum*

*Second year, second term*

*Preparation: — —*

*Three hours per week*

A study is made of the proper apportionment of the funds of a corporation for plant, equipment and working capital; and the proper distribution of profits in dividends, surplus and sinking funds.

PROFESSOR BENEDICT.

## SCHOOL OF ENGINEERING

### 53-1 BUSINESS LAW

*Curriculums: I<sub>2</sub>, II<sub>2</sub>*

*Fourth year, second semester*

*Preparation: — —*

*Two hours per week*

The course consists of a general treatment of law and its application to business, considering in particular the laws governing contracts, agency and negotiable instruments.

PROFESSOR ROLLAND.

### 53-2 BUSINESS LAW

*Full-time curriculum*

*Third year, third term*

*Preparation: — —*

*Three hours per week*

The object in giving this course is not to give a general survey of commercial law but to cover only that phase of it which engineers will find most useful. The main part of the course will cover the nature of contracts, parties to them, and their legality and interpretation. The nature and formation of agency, the duties and liabilities arising out of agency, the professional agents of different sorts, and the termination of relationship between the principal and agent are studied.

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### 54-1 MARKETING

*Curriculums: I<sub>2</sub>, II<sub>2</sub>*

*Fourth year, first semester*

*Preparation: — —*

*Three hours per week*

This subject treats of market and trade channels, territorial divisions, the selection, training, and equipment of salesmen, advertising and publicity work, and other problems of selling the manufactured product.

PROFESSOR ROLLAND.

### 54-2 ECONOMIC GEOGRAPHY

*Full-time curriculum*

*Third year, first term*

*Preparation: — —*

*Three hours per week*

The purpose of this course is to give a better understanding of the natural resources of America, which form the basis for the industrial development of this country, and to give a foundation for the study of such industrial courses as Marketing and Transportation.

A study is made of natural resources, especially food prod-

## PROGRAM OF STUDIES

ucts and raw materials. Trade routes by land and sea by which raw materials and foodstuffs are brought to the market, and by which the finished product is distributed, are touched upon. The manufacture of these crude products into finished products is emphasized.

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### 54-3 MARKETING I

*Full-time curriculum*  
*Third year, second term*

*Preparation: — —*  
*Three hours per week*

A study is made of the movement of the raw product from its source to its destination in the hands of the consumer in crude or finished form.

The course deals with the marketing of the raw product and involves a consideration of the nature of the commodity, transportation to the market, the middlemen through whose hands it passes, the trade organizations involved in handling it, etc.

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### 54-4 MARKETING II

*Full-time curriculum*  
*Third year, third term*

*Preparation: 54-3*  
*Three hours per week*

Starting with an analysis of the commodity in its finished form and of the market in which it is sold, the course considers the distributive organization, the retailers through whose hands it passes, sales organizations, and merchandising problems.

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### 54-5 RAILWAY TRANSPORTATION

*Full-time curriculum*  
*Third year, first term*

*Preparation: — —*  
*Three hours per week*

The purpose of this course is to give the student a better understanding of railway transportation. The sources of the freight traffic, organization of the freight traffic department, the organization of freight traffic associations and their purposes, classification of rates and rate making, and other special problems are considered.

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## SCHOOL OF ENGINEERING

### 54-6 RAILROAD PROBLEMS

*Full-time curriculum*

*Third year, second term*

*Preparation: — —*

*Three hours per week*

This course deals largely with the financial side of the railroad business. Among the problems that are analyzed are the following: capitalization of railroad companies, issue and marketing of securities, speculation and stock watering, government regulation, reasonableness of rates, and the basis for determining a fair return.

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## THESES

## THESES

### Class of 1922

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|------------------------------------------------------------------------------------------------------------------|------------------------|
| ALLEN, EARLE C. (with I. Rosenblatt)                                                                             | Civil Engineering      |
| <i>Design of a Reinforced Concrete Warehouse</i>                                                                 |                        |
| ALVES, JOHN J., JR. (with T. P. Boyd)                                                                            | Mechanical Engineering |
| <i>Design of a Municipal Power Plant for Chelsea and Revere</i>                                                  |                        |
| BAILEY, PERCY W. (with R. B. Brown)                                                                              | Electrical Engineering |
| <i>The Design of a Radio Telephone Installation</i>                                                              |                        |
| BALLOU, GEORGE D. (with H. S. Cook)                                                                              | Civil Engineering      |
| <i>Concrete Table</i>                                                                                            |                        |
| BOYD, THOMAS P. (with J. J. Alves)                                                                               | Mechanical Engineering |
| <i>Design of a Municipal Power Plant for Chelsea and Revere.</i>                                                 |                        |
| BRADBURY, RAYMOND J.                                                                                             | Mechanical Engineering |
| <i>The Design of a Pinning Machine</i>                                                                           |                        |
| BRITCHKY, HYMAN HARRY                                                                                            | Chemical Engineering   |
| <i>The Formation of Yellow Iron Oxide By the Electric Arc</i>                                                    |                        |
| BROWN, RICHARD B., JR. (with P. W. Bailey)                                                                       | Electrical Engineering |
| <i>The Design of a Radio Telephone Installation</i>                                                              |                        |
| BROWN, RALPH E. (with F. H. Carlson and C. S. Chase)                                                             | Electrical Engineering |
| <i>An Automatic Hydro-Electric Power Station Development for the<br/>Leicester Woolen Mill, Leicester, Mass.</i> |                        |
| BROOKS, FRANCIS W. (with C. S. Wentworth and C. I. Williams)                                                     | Mechanical Engineering |
| <i>Fuel and Brake-Horsepower Tests of a Marine Gasoline Engine</i>                                               |                        |
| CARL, JAMES W. (with E. Parad)                                                                                   | Mechanical Engineering |
| <i>Gasoline Engine Tests</i>                                                                                     |                        |
| CARLSEN, FRED HARRY (with R. E. Brown and C. S. Chase)                                                           | Electrical Engineering |
| <i>An Automatic Hydro-Electric Power Station Development for the<br/>Leicester Woolen Mill, Leicester, Mass.</i> |                        |
| CLARKE, KENNETH OLDHAM                                                                                           | Electrical Engineering |
| <i>The Design and Construction of a 175KVA Outdoor Substation<br/>Replacing an Older and Smaller One</i>         |                        |
| CHASE, CHARLES SPAULDING (with R. E. Brown and F. H. Carlson)                                                    | Electrical Engineering |
| <i>An Automatic Hydro-Electric Power Station Development for the<br/>Leicester Woolen Mill, Leicester, Mass.</i> |                        |
| COLLINS, DESMOND M.                                                                                              | Mechanical Engineering |
| <i>Artificial Drying by the Use of Mechanically Propelled Air</i>                                                |                        |
| COOK, HAROLD S. (with G. H. Ballou)                                                                              | Civil Engineering      |
| <i>Concrete Table</i>                                                                                            |                        |

## SCHOOL OF ENGINEERING

- COOKE, HOWARD W. (with F. S. Fox)                      Electrical Engineering  
*The Inaccuracy of Wattmeter Readings in Circuits of Low Power Factors.*
- COOMBS, SELDON (with T. G. Kelley)                      Mechanical Engineering  
*The Design of a Valveless Rotary Reciprocal Pump*
- CRESSY, DUSTIN G. (with M. E. Wright)                      Electrical Engineering  
*The Feasibility of Automatic Control of Portable Substations for the Massachusetts Northeastern Street Railway Company.*
- DAVIS, STUART S. (with F. J. Holthaus)                      Electrical Engineering  
*Effects of Alternating Currents on a Solenoid*
- DEARBORN, ELMORE L.                                              Civil Engineering  
*Design of a Concrete Culvert in South Weymouth, Mass.*
- ENGSTROM, HOWARD T.                                              Chemical Engineering  
*An Investigation into the Properties of Propyl and Isopropyl Alcohols which cause the latter to Precipitate Colloidal Silver Sols upon which the Former has no effect*
- FAUNCE, LAWRENCE S. (with T. S. Ireland)                      Mechanical Engineering  
*Tests on Rider-Ericsson Engine*
- FLOOD, FRANK L. (with C. S. Toole)                      Civil Engineering  
*System of Sewerage and Sewage Disposal for Town of Needham*
- FOWLER, WILLIAM H. (with A. D. Parsons)                      Civil Engineering  
*The Relocation and Design of a Highway Bridge in Northbridge, Mass.*
- FOX, FRANK S. (with H. W. Cooke)                      Electrical Engineering  
*The Inaccuracy of Wattmeter Readings in Circuits of Low Power Factors*
- FRYE, RICHARD B.                                              Mechanical Engineering  
*Design of Steam Electric Power Plant*
- GOULET, NARCISSE T.                                              Chemical Engineering  
*The Behavior of Vat Dyes in their Application to Cotton Piece Goods*
- GUNTHER, FREDERICK E. (with I. A. Lee)                      Electrical Engineering  
*Instruments and Wiring Arrangements for Standardizing and Calibrating Laboratory at Northeastern University*
- HARDING, ARTHUR E.                                              Civil Engineering  
*Investigation of Present Location of Northeastern University with Proposed Development to Provide for Additional Buildings and Athletic Field*
- HALE, HAROLD W. (with H. T. Pearce)                      Civil Engineering  
*Proposed Elimination of Grade Crossing at Concord Junction, Mass.*
- HOLTHAUS, FREDERICK J. (with S. S. Davis)                      Electrical Engineering  
*Effects of Alternating Currents on a Solenoid*
- HULSMAN, DAVID L.                                              Chemical Engineering  
*To Condense between 450° and 500° F, and determine the Properties and uses of an Oil Distillate derived from a Blown Petroleum Asphalt*

## THESES

- IRELAND, THEODORE S. (with L. S. Faunce)      Mechanical Engineering  
*Tests on Rider-Ericsson Engine*
- JUNIOR, FRANCIS E.      Civil Engineering  
*Preliminary Design for an Engine House at the Riverside Station  
 Grounds of the Boston and Albany Railroad*
- KELLEY, THOMAS G. (with S. Coombs)      Mechanical Engineering  
*The Design of a Valveless Rotary Reciprocal Pump*
- LEE, I. ALBERT (with F. E. Gunther)      Electrical Engineering  
*Instruments and Wiring Arrangements for Standardizing and  
 Calibrating Laboratory at Northeastern University*
- LEE, WALTER H.      Civil Engineering  
*The Elimination of the Grade Crossing at Hill Crossing, Belmont,  
 Mass.*
- LOVEJOY, RICHARD P.      Chemical Engineering  
*A Study into Methods for the Extraction of Wax from Sugar Cane  
 and its Purification with a view to Commercial Utilization of  
 the Same*
- MALONEY, EDWARD F.      Chemical Engineering  
*The Design of a Gas Sampling Apparatus for High Temperature  
 Service and Determination of Qualities of Three Types of  
 Metallurgical Air Furnaces*
- MARCUS, MAURICE      Civil Engineering  
*Maine Terminal Design*
- MORGAN, STUART H.      Chemical Engineering  
*Extraction and Examination of Asphalt*
- NORBERG, ERNEST M. (with C. T. Rhoades)      Civil Engineering  
*Extension of Quincy Shore Boulevard at Atlantic, Mass.*
- NYLIN, CARL G.      Mechanical Engineering  
*Boiler Room Design of a Modern Plant*
- NYMAN, CHESTER L. (with E. C. Williams)      Civil Engineering  
*Design of Causeway and Reinforced Concrete Arch over Lake  
 Cochituate, Natick, Mass.*
- PARAD, EMANUEL (with J. W. Carl)      Mechanical Engineering  
*Gasoline Engine Tests*
- PARSONS, ALFRED D. (with W. H. Fowler)      Civil Engineering  
*The Relocation and Design of a Highway Bridge in Northbridge,  
 Mass.*
- PARSONS, EDWARD S.      Civil Engineering  
*Design of the Center Span of a Proposed Three-span Reinforced  
 Concrete Arch Bridge over Lobster Cove at Annisquam, Glou-  
 cester, Mass.*
- PAVER, WILLIAM H. (with R. E. Travis)      Mechanical Engineering  
*Cutting Speeds and Time Required for Machine Work*
- PEARCE, HOWARD T. (with H. W. Hale)      Civil Engineering  
*Proposed Elimination of Grade Crossing at Concord Junction, Mass.*

## SCHOOL OF ENGINEERING

- PEARSON, CARL ROGER Civil Engineering  
*Design of a Reinforced Concrete Bridge between Winthrop and Boston, Mass.*
- RHOADES, CLIFFORD T. (with E. M. Norberg) Civil Engineering  
*Extension of Quincy Shore Boulevard at Atlantic, Mass.*
- ROBBINS, BERTRAND B. Electrical Engineering  
*The Kenotia a Direct Current High Voltage Testing Machine for Cable Insulation*
- ROSEN, PHILIP Chemical Engineering  
*The Factors Affecting the Thermal Chemical Reactions in a Water Gas Set*
- ROSENBLATT, IRVING (with E. C. Allen) Civil Engineering  
*Design of a Reinforced Concrete Warehouse*
- SAMPSON, EDWARD NORTON Electrical Engineering  
*A Rubber Glove Testing Set*
- SARGENT, SHAW D. Electrical Engineering  
*A Comparative Test of an Induction Motor and Construction of a Slip-measuring Device*
- SHOPNECK, HENRY PHILIP Chemical Engineering  
*The Preparation of Trinitrobenzaldehyde*
- SPEHL, WARREN Chemical Engineering  
*The Study of Cellulose Acetate as a Lacquer for Leather*
- SULLIVAN, JOHN J. Electrical Engineering  
*The Design of a Hydro-Electric Power Plant*
- TOOLE, CAMERON S. (with F. L. Flood) Civil Engineering  
*System of Sewerage and Sewage Disposal for Town of Needham*
- TRAVIS, ROBERT S. (with W. H. Paver) Mechanical Engineering  
*Cutting Speeds and Time Required for Machine Work*
- TURNER, BURTON G. Civil Engineering  
*Proposed Relocation of Morton Street between Mattapan and Dorchester Mills*
- WENTWORTH, CLARENCE S. (with F. W. Brooks and C. I. Williams) Mechanical Engineering  
*Fuel and Brake-Horsepower Tests of a Marine Gasoline Engine*
- WHEELER, CLIFFORD E. Chemical Engineering  
*Study of the Identification of Asphalt*
- WILLIAMS, CHARLES I. (with F. W. Brooks and C. S. Wentworth) Mechanical Engineering  
*Fuel and Brake-Horsepower Tests of a Marine Gasoline Engine*
- WILLIAMS, EDWIN CHESTER (with C. L. Nyman) Civil Engineering  
*Design of Causeway and Reinforced Concrete Arch over Lake Cochituate, Natick, Mass.*
- WRIGHT, MOSES E., JR. (with D. G. Cressy) Electrical Engineering  
*The Feasibility of Automatic Control of Portable Substations for the Massachusetts Northeastern Street Railway Company*

# COURSES OF INSTRUCTION

No.	SUBJECT	Curriculum	Year
010-1	English	All	1
010-2	Literature I	Full-time	2
010-3	Literature II	Full-time	2
010-4	Literature III	Full-time	2
010-5	Public Speaking I	Full-time	3
010-6	Public Speaking II	Full-time	3
010-7	Public Speaking III	Full-time	3
011-1	German	IV	2
011-2	German	IV	3
012-1	History of Science	I, II, III	1
012-2	Modern History I	Full-time	2
012-3	Modern History II	Full-time	2
013-1	Government	All	3
013-2	Municipal Government	Full-time	2
014-1	Economics	All	3
014-2	Sociology I	Full-time	2
014-3	Sociology II	Full-time	2
014-4	Psychology	Full-time	2
014-5	Outline of Ethics	Full-time	3
014-6	Labor Problems	Full-time	3
014-7	Labor Legislation	Full-time	3
020-1	College Algebra	All	1
021-1	Trigonometry	All	1
022-1	Analytic Geometry	All	1
023-1	Differential Calculus	All	2
023-2	Integral Calculus	All	2
030-1	Physics	All	1
031-1	Physics	All	1
032-1	Light	All	2
033-1	Heat	All	2
034-1	Physics Laboratory	All	1
034-2	Physics Laboratory	All	2
034-3	Physics Laboratory	All	2
041-1	Mechanical Drawing	All	1
041-2	Mechanical Drawing	I, IV	1
041-3	Mechanical Drawing	II, III	1
042-3	Machine Drawing	II	2
042-5	Engineering Drawing	III	2
042-6	Engineering Drawing	IV	2
043-1	Descriptive Geometry	I, II, III	1
044-2	Mechanism	II	2
044-3	Mechanism	II	2
050-1	Engineering Conference	All	3, 4
052-1	Thesis	All	4
060-1	Physical Training	All	1
11-1	Surveying	I	1
11-2	Surveying	I	1
11-3	Surveying, Field and Plotting	I	1
11-4	Surveying, Field and Plotting	I	1
11-5	Surveying	I	2
11-6	Surveying, Field and Plotting	I	2
12-1	Railroad Surveying	I	2
12-2	Railroad Surveying, Field and Plotting	I	2
12-3	Railroad Engineering	I	3
12-4	Railroad Engineering, Field and Plotting	I	3
13-1	Hydraulics	I, II <sub>1</sub>	3
13-2	Hydraulic Motors	II <sub>1</sub>	3
13-3	Hydraulics	III, IV	3
14-1	Theory of Structures	I	3
14-3	Engineering Structures	I	4
14-5	Structural Drawing	I	3
14-6	Structural Drawing	I	3
14-7	Structural Design	I	4
14-8	Structural Design	I	4
15-1	Concrete	I <sub>1</sub>	4
15-2	Concrete Design	I <sub>1</sub>	4
15-3	Concrete	II <sub>1</sub>	4
16-1	Materials	I, II	4
16-2	Testing Materials Laboratory	I	3
16-3	Foundations	I <sub>1</sub>	4
16-4	Geology	I	3
17-1	Highways	I <sub>1</sub>	4
21-1	Applied Mechanics (Statistics)	All	2
21-2	Applied Mechanics (Kinetics)	All	2
21-3	Strength of Materials	I, II	3

# SCHOOL OF ENGINEERING

No.	SUBJECT	Curriculum	Year
21-4	Strength of Materials	III, IV	3
22-1	Graphical Analysis	II	3
22-2	Machine Design	II	3
22-3	Machine Design	II	4
22-4	Machine Design	II <sub>1</sub>	4
22-5	Mechanisms of Machines	II <sub>1</sub>	3
23-1	Heat Engineering	II	3
23-2	Engineering Laboratory	II <sub>2</sub> , III	4
23-3	Heat Engineering	I, II, IV	3
23-4	Steam Turbines	II <sub>1</sub>	4
23-5	Heat Engineering	II <sub>1</sub>	4
23-6	Engineering Laboratory	II <sub>1</sub>	4
23-7	Heat Engineering	II <sub>1</sub>	3
24-1	Production Engineering	II	1
24-3	Power Plant Equipment	II <sub>1</sub>	3
24-4	Power Plant Engineering	II	4
24-6	Standard Eng. Products and Processes	II, III	4
25-1	Industrial Plants	II	4
30-1	Applied Electricity I	I, II, IV	2
30-3	Applied Electricity II	I, II, IV	2
30-4	Applied Electricity Laboratory	I, II	2
32-1	Electrical Engineering I	III	1
32-3	Electrical Engineering II	III	2
32-4	Electrical Engineering II Laboratory	III	2
32-6	Electrical Engineering III Laboratory	III	3
32-7	Electrical Engineering III	III	3
32-8	Electrical Engineering IV, Laboratory	III	4
32-9	Electrical Engineering IV	III	4
33-1	Electrical Measurements	III	3
33-2	Electrical Measurements Laboratory	III	3
33-4	Advanced Standardizing Laboratory	III	4
34-1	Advanced Engineering V	III	4
35-1	Advanced Electricity	III	4
40-1	Inorganic Chemistry	I, * II, III	3 * 1
41-1	Inorganic Chemistry	IV	1
41-2	Inorganic Chemistry Laboratory	IV	1
42-1	Qualitative Analysis	IV	1
42-2	Qualitative Analysis Laboratory	IV	1
43-1	Quantitative Analysis	IV	2
43-2	Quantitative Analysis Laboratory	IV	2
44-1	Technical Analysis	IV	3
44-2	Technical Analysis Laboratory	IV	3
44-3	Technical Analysis	IV	3
45-1	Organic Chemistry	IV	3
45-2	Organic Chemistry Laboratory	IV	3
45-3	Organic Chemistry	IV	4
45-4	Organic Chemistry Laboratory	IV	4
46-2	Chemical Engineering	IV	3
46-3	Chemical Engineering	IV	4
47-1	Industrial Chemistry	IV	4
47-2	Industrial Chemistry Laboratory	IV	4
48-1	Physical Chemistry	IV	4
50-1	Industrial Organization	I <sub>2</sub> , II <sub>2</sub>	3
50-2	Industrial Finance	I <sub>2</sub> , II <sub>2</sub>	3
50-4	Business Management	I <sub>2</sub> , II <sub>2</sub>	4
50-6	Business Administration	I <sub>2</sub> , II <sub>2</sub>	4
50-7	Industrial Organization	Full-time	2
50-8	Business Administration I	Full-time	3
50-9	Business Administration II	Full-time	3
50-10	Business Management	Full-time	3
51-1	Principles of Accounting	I <sub>2</sub> , II <sub>2</sub>	3
51-3	Principles of Accounting I	Full-time	2
51-4	Principles of Accounting II	Full-time	2
51-5	Cost Accounting	Full-time	2
52-1	Banking and Securities	I <sub>2</sub> , II <sub>2</sub>	3
52-2	Banking	Full-time	2
52-3	Industrial Finance	Full-time	2
53-1	Business Law	I <sub>2</sub> , II <sub>2</sub>	4
53-2	Business Law	Full-time	3
54-1	Marketing	I <sub>2</sub> , II <sub>2</sub>	4
54-2	Economic Geography	Full-time	3
54-3	Marketing I	Full-time	3
54-4	Marketing II	Full-time	3
54-5	Railway Transportation	Full-time	3
54-6	Railroad Problems	Full-time	3

## REGISTER OF STUDENTS

### REGISTER OF STUDENTS

#### Enrolled During the School Year 1923-1924

NAME	DEPT.	YEAR	HOME ADDRESS
Abbott, Leon	E.E.	1925	Watertown
Abramovitz, Julius	C.E.	1925	Malden
Aimo, Karl H.	C.E.	1923	Allston
Ainsleigh, Charles D. Jr.	C.E.	1925	Atlantic
Akerley, Harold W.	Ch.E.	1926	Somerville
Alden, Edgar O.	E.E.	1925	East Saugus
Alexander, William T.	M.E.	1925	Brunswick, Me
Allan, Charles R.	M.E.	1923	Pittsfield
Allan, William W.	C.E.	1924	Jamaica Plain
Allen, Chester M. Jr.	M.E.	1926	South Hadley
Allis, Arthur S.	C.E.	1926	Salem
Anasoulis, Costas	Ch.E.	1926	Peabody
Anderson, Arthur C.	M.E.	1925	Weymouth
Anderson, Carl L.	E.E.	1926	Rockport
Anderson, Carl R.	E.E.	1926	Orange
Anderson, E. Allen	Ch.E.	1924	Norwood
Anderson, Fordyce W.	C.E.	1926	Ashfield
Anderson, Henry G.	M.E.	1924	West Roxbury
Andrew, Floyd O.	M.E.	1926	Cheshire, Conn.
Andrew, Phillip J.	E.E.	1926	Ayer
Anthony, Sidney S.	C.E.	1925	Manchester, N. H.
Arsenault, Arthur J.	M.E.	1926	Boston
Arvesen, Ralph A.	C.E.	1926	Quincy
Ash, Clarence D.	Ch.E.	1925	Somerville
Asnes, Benjamin	Ch.E.	1926	Quincy
Astle, William H., Jr.	Ch.E.	1926	Groveton, N. H.
Atlin, Paavo H.	C.E.	1926	Fitchburg
Avery, Lloyd D.	E.E.	1926	Webster
Axford, Clarence A.	Ch.E.	1926	Plymouth
Ayer, Raymond B.	E.E.	1925	Plainville
Ayles, Vernon M.	C.E.	1925	Newton Highlands
Baader, Albert J.	E.E.	1924	Everett
Bacon, Dana H.	E.E.	1926	E. Bridgewater
Bacon, Robert E.	E.E.	1925	Nobscot
Badger, William L.	Ch.E.	1926	Lynn
Bailey, Harry W., Jr.	E.E.	1926	Auburndale
Baker, Charles G.	E.E.	1924	Georgetown
Baker, Joseph L.	M.E.	1926	N. Grosvenordale, Conn.
Baldi, Hugo A.	C.E.	1926	Everett
Bamford, Harold F.	Ch.E.	1926	Newburyport
Banwell, Arthur W.	M.E.	1925	Chelsea
Baratta, Edmund A.	C.E.	1925	Everett
Barber, Dana H.	M.E.	1924	Newton
Barker, Edward H.	E.E.	1925	E. Bridgewater
Barnes, Julius L.	M.E.	1926	Allston
Barnett, Stewart K.	C.E.	1925	East Douglas
Barney, Kenneth M.	E.E.	1924	Dorchester
Barr, Thornton E.	M.E.	1924	Reading

## SCHOOL OF ENGINEERING

NAME	DEPT.	YEAR	HOME ADDRESS
Barrett, Roger N.	E.E.	1924	<i>Marlboro</i>
Barry, John J.	E.E.	1924	<i>Salem</i>
Bartlett, James H.	C.E.	1924	<i>Quincy</i>
Bartlett, Lothrop B.	Ch.E.	1925	<i>East Walpole</i>
Barton, Kenneth L.	C.E.	1925	<i>Meriden, N. H.</i>
Batchelder, Raymond	E.E.	1925	<i>Manchester, N. H.</i>
Bates, Allen W.	E.E.	1926	<i>Cohasset, Mass.</i>
Beal, Carroll H.	E.E.	1926	<i>Cornville, Me.</i>
Beard, Welden N.	E.E.	1925	<i>Melrose Highlands</i>
Bearse, Nelson	C.E.	1926	<i>Centerville</i>
Bearse, Richard C.	M.E.	1924	<i>Springfield</i>
Beattie, Robert	M.E.	1924	<i>Everett</i>
Beaumont, Leo E.	M.E.	1926	<i>Wollaston</i>
Becker, Abraham A.	Ch.E.	1923	<i>Cambridge</i>
Beckley, Richard C.	M.E.	1926	<i>Southington, Conn.</i>
Bemis, Norman C.	M.E.	1926	<i>Gleasondale</i>
Bender, Albert V.	E.E.	1925	<i>Dorchester</i>
Bengston, Nils B.	M.E.	1926	<i>Everett</i>
Benjamin, George C.	C.E.	1926	<i>Melrose</i>
Bennett, Willard E.	E.E.	1926	<i>Concord, N. H.</i>
Benoit, Everett C.	E.E.	1926	<i>Pawtucket, R. I.</i>
Benson, Raymond H.	M.E.	1924	<i>Athol</i>
Bent, Ralph M.	E.E.	1926	<i>Cochituate</i>
Berkover, Jacob	C.E.	1926	<i>Taunton</i>
Berman, Harold A.	E.E.	1925	<i>Roxbury</i>
Berry, Earl R.	E.E.	1926	<i>Worcester</i>
Bertini, George E.	C.E.	1925	<i>Everett</i>
Bessom, Ralph E.	M.E.	1923	<i>Lynn</i>
Bigelow, Cecil H.	M.E.	1923	<i>Monument Beach</i>
Bigelow, Maurice H.	Ch.E.	1924	<i>Concord</i>
Bikofsky, Isidor	C.E.	1925	<i>Boston</i>
Bingham Lloyd A.	E.E.	1924	<i>Middlebury, Vt.</i>
Bissett, John E.	E.E.	1925	<i>Quincy</i>
Blacker, Fred J.	E.E.	1926	<i>Somerville</i>
Blake, Clarence D.	E.E.	1926	<i>Woburn</i>
Blake, Howard J.	Ch.E.	1924	<i>Boston</i>
Blatchford, Lawrence H.	M.E.	1926	<i>Framingham</i>
Blodgett, Newton K.	E.E.	1925	<i>Colebrook, N. H.</i>
Bloom, Maurice	C.E.	1926	<i>Somerville</i>
Blumer, Edwin F.	M.E.	1924	<i>Brookfield</i>
Blumberg, Carlton J.	Ch.E.	1926	<i>Gloucester</i>
Blunda, Ignazio	C.E.	1926	<i>East Boston</i>
Boardman, Offin G.	E.E.	1926	<i>Braintree</i>
Bodemer, Philip E.	C.E.	1924	<i>Cambridge</i>
Boman, Henry S.	Ch.E.	1926	<i>Abington</i>
Bonazzoli, August G.	Ch.E.	1926	<i>Bolton</i>
Bonney, Orvis W.	E.E.	1926	<i>Bath, Me.</i>
Boothroyd, Edwin	E.E.	1925	<i>Fall River</i>
Bouchard, George H.	Ch.E.	1924	<i>Topsfield</i>
Bowie, John H.	C.E.	1925	<i>East Milton</i>
Boyd, Ronald A.	E.E.	1924	<i>Taunton</i>
Boynton, John L.	E.E.	1926	<i>Oswego, N. Y.</i>
Bradbury, Rolfe C.	Ch.E.	1925	<i>Cliftondale</i>
Bradford, Cecil B.	M.E.	1924	<i>Plainfield, Conn.</i>

## REGISTER OF STUDENTS

NAME	DEPT.	YEAR	HOME ADDRESS
Bradley, John J.	E.E.	1926	<i>Concord</i>
Bradshaw, Alfred O.	C.E.	1924	<i>Newburyport</i>
Bradstreet, Raymond	Ch.E.	1924	<i>Middleton</i>
Braica, Anthony A.	C.E.	1926	<i>Springfield</i>
Brask, Henry	C.E.	1923	<i>Attleboro</i>
Bray, Wesley T.	C.E.	1925	<i>Torrington, Conn.</i>
Breen, John J.	Ch.E.	1924	<i>Rockport</i>
Bresson, Jules G.	C.E.	1926	<i>Torrington, Conn.</i>
Brewer, Arthur R.	M.E.	1924	<i>Bar Harbor, Me.</i>
Briggs, Leon R.	C.E.	1926	<i>Adams</i>
Britt, Francis V.	C.E.	1926	<i>Cambridge</i>
Broadley, William A.	E.E.	1925	<i>East Walpole</i>
Brooks, Curtis C.	M.E.	1924	<i>North Hanover</i>
Brooks, John S.	M.E.	1924	<i>North Hanover</i>
Broughton, Winn G.	M.E.	1926	<i>Peabody</i>
Brown, Alfred	Ch.E.	1924	<i>Everett</i>
Brown, Carl E., Jr.	C.E.	1926	<i>Lunenburg</i>
Brown, Earl M.	Ch.E.	1926	<i>Everett</i>
Brown, George P.	Ch.E.	1926	<i>Plymouth</i>
Brown, Gilbert M.	C.E.	1925	<i>Amherst</i>
Brown, Harold T.	M.E.	1926	<i>Marblehead</i>
Brown, Kenneth T.	E.E.	1926	<i>Mexico, Me.</i>
Brown, Walter C.	E.E.	1925	<i>Dorchester</i>
Bruce, Herbert A.	C.E.	1925	<i>Waverly</i>
Brustin, Nathan	C.E.	1926	<i>Malden</i>
Bryant, Everett H.	E.E.	1926	<i>E. Templeton</i>
Buck, Harold A.	C.E.	1925	<i>Springfield</i>
Burgess, Edward T.	C.E.	1925	<i>Jamaica Plain</i>
Burke, George L.	C.E.	1924	<i>Norwood</i>
Burke, George M.	M.E.	1926	<i>Arlington</i>
Burke, James L.	E.E.	1926	<i>Everett</i>
Burrill, Kenneth C.	Ch.E.	1926	<i>Everett</i>
Burton, Carl Elton	Ch.E.	1926	<i>Everett</i>
Bushnell, Laverne	M.E.	1923	<i>Dedham</i>
Butterworth, Percy T.	E.E.	1923	<i>Boston</i>
Calderwood, Luther J.	Ch.E.	1926	<i>Camden, Me.</i>
Caldon, Deforest H.	C.E.	1926	<i>Gardner</i>
Callanan, Herbert A.	M.E.	1923	<i>Danvers</i>
Callanan, Walter	E.E.	1925	<i>Danvers</i>
Cameron, Harry H.	E.E.	1926	<i>Concord, N. H.</i>
Campbell, Cedric C.	E.E.	1926	<i>Medford</i>
Campbell, Malcolm K.	C.E.	1926	<i>Somerville</i>
Campbell, Oscar J.	M.E.	1924	<i>Hudson, N. H.</i>
Carlson, Elmer T.	E.E.	1925	<i>Sandwich</i>
Carlson, Sten J.	M.E.	1926	<i>Norwood</i>
Carman, Willard A.	E.E.	1926	<i>Ayer</i>
Carpenter, Cecil P.	E.E.	1926	<i>West Somerville</i>
Carrie, John	E.E.	1926	<i>Fairhaven</i>
Carroll, Francis R.	Ch.E.	1923	<i>Cambridge</i>
Carroll, Frank J.	E.E.	1925	<i>Taunton</i>
Carroll, John T.	M.E.	1926	<i>Watertown</i>
Carswell, Archie A.	C.E.	1925	<i>Manchester</i>
Castonguay, A. Harold	C.E.	1925	<i>Brewster</i>
Caswell, Orville G.	M.E.	1923	<i>Lynn</i>

## SCHOOL OF ENGINEERING

NAME	DEPT.	YEAR	HOME ADDRESS
Chadwick, Earle R.	E.E.	1925	Blandford
Chase, Carroll B.	M.E.	1926	Canaan, Me.
Chase, Donald L.	M.E.	1926	Bangor, Me.
Chase, Fred W. Jr.	C.E.	1924	Newburyport
Childs, George S.	C.E.	1926	Hyde Park
Chilson, Warren A.	Ch.E.	1924	Milford
Christenson, Edward R.	C.E.	1925	Lee
Christenson, Henry L.	E.E.	1925	Lee
Clark, Charles H.	M.E.	1925	Medfield
Clark, Edward A.	E.E.	1926	Northampton
Clark, Raymond F.	E.E.	1925	No. Abington
Clarke, Robert H.	M.E.	1923	Melrose Highlands
Clement, John D.	E.E.	1926	Waltham
Clerke, Philip N.	E.E.	1925	Washington, D. C.
Cloyes, Russell F.	C.E.	1926	Belmont
Cobb, Lewis E.	E.E.	1926	West Medford
Coburn, Wendell F.	Ch.E.	1924	Braintree
Cochrane, Earle S.	C.E.	1926	Cambridge
Coffin, Charles C.	M.E.	1924	Nantucket
Cohen, Abraham B.	Ch.E.	1926	Mattapan
Cohen, Morris	C.E.	1925	Dorchester
Colburn, Hardy R.	M.E.	1924	Boston
Collins, William J.	E.E.	1926	Cambridge
Collins, William S.	E.E.	1926	Quincy
Comstock, Alvin F.	E.E.	1926	Devon, Conn.
Conant, Hamilton N.	E.E.	1926	Newburyport
Connolly, Thomas H.	E.E.	1926	Natick
Connor, Wilbert H.	C.E.	1925	Orient Heights
Conway, William J.	Ch.E.	1926	Holyoke
Cook, Charles W.	C.E.	1926	Lynn
Cook, Hiram J.	M.E.	1923	Franklin
Cooke, Joseph W.	E.E.	1925	Goshen, Conn.
Cooke, Ralph W.	M.E.	1926	Vergennes, Vt.
Cooper, Charles S.	C.E.	1924	Dorchester
Cooper, George I.	Ch.E.	1924	Dorchester
Corliss, Theodore A.	M.E.	1925	Somerville
Corvin, William B.	E.E.	1926	Dorchester
Corsano, Nicholas A.	M.E.	1925	East Boston
Cotter, Edward J.	E.E.	1926	Boston
Courlang, Maurice	E.E.	1925	Boston
Cox, Allan N.	Ch.E.	1924	Wellesley
Crafts, Harold W.	E.E.	1924	Ashfield
Cragin, Donald G.	M.E.	1925	Framingham
Cramb, Lester P.	E.E.	1925	Melrose
Crockett, Elton G.	E.E.	1925	Plainville
Cross, Robert C.	M.E.	1925	W. Springfield
Crossman, Hartwell H.	C.E.	1923	Attleboro
Crowley, Joseph E.	E.E.	1926	Salem
Crowley, Walter F.	Ch.E.	1926	Medford
Cummings, Howard	Ch.E.	1926	Melrose
Cummings, John J.	C.E.	1923	Roxbury
Cushing, Levi G.	E.E.	1923	South Duxbury
Cushing, Samuel A.	E.E.	1924	Beverly
Cushing, Samuel	E.E.	1925	Cambridge

## REGISTER OF STUDENTS

NAME	DEPT.	YEAR	HOME ADDRESS
Cutler, Wallace E.	E.E.	1925	Franklin, N. H.
Damon, Donald B.	Ch.E.	1923	Keene, N. H.
D'Amore, Joseph E.	C.E.	1926	East Boston
Daniels, James W.	M.E.	1925	Lupton, Mich.
Davey, Frank H.	E.E.	1925	New London, Conn.
Davidson, Edwin F.	Ch.E.	1925	Atlantic
Davis, Donald A.	M.E.	1926	Carlisle
Davis, Leon P.	C.E.	1923	Kennebunk, Me.
Dawe, Allen S.	C.E.	1923	Cambridge
Day, Charles D., Jr.	M.E.	1926	Taunton
Day, George W.	E.E.	1925	Peaks Island, Me.
Day, John L., Jr.	C.E.	1926	Roslindale
DeBiasi, Charles P.	C.E.	1926	Noank, Conn.
DiCicco, Ruzziero	M.E.	1926	Concord
Dickerman, Ralph T.	C.E.	1925	Taunton
Dickson, Franklin B.	E.E.	1926	Milton, N.H.
Dickson, Richard M.	M.E.	1924	Holyoke
Dill, E. Arnold	C.E.	1926	Raynham Centre
D'Italia, Raymond	E.E.	1925	Medford Hillside
Dixon, George W.	M.E.	1926	Fall River
Dixon, Herbert C.	C.E.	1923	Gloucester
Dobbs, S. Beardsley	Ch.E.	1926	Malden
Dodge, Walter E.	M.E.	1926	Belchertown
Dolan, Laurence E.	E.E.	1925	Middlebury, Vt.
Donick, Frank C.	M.E.	1926	Dorchester
Donnelly, Robert L.	C.E.	1923	Beverly
Douglas, Alton L.	M.E.	1923	Melrose
Drew, Edwin C.	E.E.	1925	Marshfield Hills
Duguid, John L.	E.E.	1925	Natick
Dunlap, William F.	C.E.	1925	Plymouth
Duston, Carmillus W.	M.E.	1923	Frammingham
Earle, Alvin L.	E.E.	1926	Somerville
Edson, Carl R.	E.E.	1926	Elmwood
Edwards, Carl W.	E.E.	1925	Malden
Ek, Arthur E.	M.E.	1926	Portland, Me.
Eldridge, Gordon B.	Ch.E.	1924	Concord
Eldridge, Raymond E.	E.E.	1926	Ashland
Elliott, Donald C.	M.E.	1926	Danvers
Elliott, Frank R.	Ch.E.	1924	Springfield
Ellms, Lindsay	E.E.	1923	Cohasset
Elwell, Maynard	E.E.	1926	Dorchester
Ely, Rodney B.	C.E.	1924	Centerbrook, Conn.
Emery, Carl B.	C.E.	1924	Portland, Me.
Engstrand, Waldo A.	E.E.	1923	Cranston, R. I.
Erickson, Robert	M.E.	1926	Fitchburg
Ericson, Frederic O.	M.E.	1925	Beverly
Erskine, James S.	E.E.	1923	Newburyport
Everett, Albert E.	C.E.	1923	Everett
Ewell, Frederick A.	E.E.	1924	Medford
Fairbrother, Russell	Ch.E.	1925	Boston
Farland, George E.	Ch.E.	1926	Melrose Highlands
Farr, Alton W.	E.E.	1926	Manchester, Me.
Ferguson, Arthur W.	E.E.	1924	Everett
Ferguson, George	Ch.E.	1925	E. Weymouth

## SCHOOL OF ENGINEERING

NAME	DEPT.	YEAR	HOME ADDRESS
Ferguson, Joseph A.	C.E.	1926	Lincoln, N. H.
Ferris, Fred S.	E.E.	1926	Boston
Ferris, James E.	Ch.E.	1926	Somerville
Fisher, John H.	E.E.	1926	Quincy
Fitzpatrick, Joseph B.	C.E.	1923	Somerville
Fleming, Ross K.	M.E.	1926	Beverly
Flynn, Roland W.	M.E.	1926	Concord Junction
Flynn, Stephen J.	E.E.	1925	Woburn
Foisie, George E.	C.E.	1923	Nashua, N. H.
Foley, Harold E.	E.E.	1926	Everett
Ford, James B.	E.E.	1924	Melrose
Ford, William R.	C.E.	1926	Mars Hill, Me.
Foss, Walter T.	E.E.	1926	Marblehead
Foster, Harry B.	E.E.	1924	Medford
Fowler, Earl W.	E.E.	1925	Westfield
Fraser, William A.	E.E.	1923	Jamaica Plain
Frazier, Stuart D.	Ch.E.	1925	Hyde Park
Freeman, Isadore W.	Ch.E.	1924	Winthrop
Freeman, James A.	C.E.	1924	Attleboro
French, Benjamin H.	Ch.E.	1925	Boston
French, Murvin A.	E.E.	1925	Framingham
Friend, Omar W.	C.E.	1926	No. Anson, Me.
Frost, Daniel C.	C.E.	1926	Newburyport
Frost, George	E.E.	1924	Watertown
Frye, Harold B.	C.E.	1925	Boston
Fuller, Bradley	Ch.E.	1926	So. Hamilton
Fuller, John, Jr.	Ch.E.	1925	Atlantic
Fulman, Morris	M.E.	1926	Chelsea
Fundin, Hjalmar O. E.	M.E.	1924	Mattapan
Furrier, Joseph P.	C.E.	1923	Lynn
Gaffey, Francis J.	M.E.	1923	Salem
Gale, F. Gardiner	E.E.	1926	Concord Junction
Gallo, Bernard C.	C.E.	1926	East Boston
Gamble, Harold G.	E.E.	1926	Dorchester
Gandreau, Louis E.	M.E.	1926	New London, Conn.
Gargaro, Alfred	C.E.	1923	Quincy
Garney, Emery W.	C.E.	1924	Bridgewater
Gebhardt, Louis F.	M.E.	1926	Boston
Gerber, Nathan	M.E.	1925	Roxbury
Gifford, Clarence H.	M.E.	1926	So. Westport
Gilbert, Merton L.	E.E.	1923	Cohasset
Gilman, Cecil E.	C.E.	1925	Madison, N. H.
Given, Sidney H.	C.E.	1925	W. Somerville
Gleason, Carl B.	Ch.E.	1923	Marblehead
Glickman, Harry	M.E.	1926	West Medway
Goddard, George W.	M.E.	1924	Somerville
Godfrey, Carl R.	M.E.	1926	Dorchester
Gonsalves, John G.	E.E.	1926	Woburn
Gordon, Phineas	C.E.	1923	Boston
Gowen, Alton	M.E.	1926	Medford
Grabau, Francis W.	E.E.	1926	Hyde Park
Graham, Elmer W.	E.E.	1926	Dorchester
Graham, Frank E.	Ch.E.	1926	Boston
Grant, Charles W.	M.E.	1926	West Roxbury

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NAME	DEPT.	YEAR	HOME ADDRESS
Gray, Wilbur S.	E.E.	1925	Salem
Gregg, Earl F.	E.E.	1926	Mars Hill, Me.
Grew, Louis K.	E.E.	1926	Mars Hill, Me.
Grey, Arthur R.	C.E.	1924	Rowley
Griffen, Herbert L.	C.E.	1926	Kingston, N. H.
Griggs, Edward W.	Ch.E	1926	Meredith, N. H.
Grondahl, George A.	E.E.	1926	Maynard
Grout, Philip R.	C.E.	1925	Gill
Grover, Wesley S.	C.E.	1926	Mansfield
Grozier, John W.	E.E.	1923	Foxboro
Grunthalt, Nathan B.	Ch.E.	1926	Boston
Guest, James A.	M.E.	1926	Brownville Junction
Hackett, James D.	E.E.	1925	Watertown
Haendler, Anton T.	E.E.	1926	Dorchester
Hakesley, Edward R.	E.E.	1926	Somerville
Hale, Edward C.	M.E.	1926	Holden
Hale, James E.	E.E.	1925	Monson
Hall, Guy H.	C.E.	1926	Dexter, Me.
Hall, Robert A.	E.E.	1924	Brookline
Hall, Stewart B.	M.E.	1926	Gildersleeve, Conn.
Hallam, Frank W.	E.E.	1925	Winthrop
Hamill, Alfred B.	Ch.E.	1926	E. Jaffrey, N. H.
Hamilton, Carroll L.	E.E.	1925	Portland, Me.
Hammond, Cleon C.	E.E.	1923	Whitman
Hamparian, Hampar B.	C.E.	1926	Roxbury
Hampe, Fritz F.	C.E.	1926	Jamaica Plain
Hannable, Daniel W.	M.E.	1925	Beverly Farms
Hanson, Erling A.	C.E.	1926	Boston
Harles, Harry J.	E.E.	1926	Massena, N. Y.
Harlow, Elmer R.	C.E.	1924	Plymouth
Harrington, Elvin E.	M.E.	1925	Milton
Harrington, Frank C.	E.E.	1924	So. Woodstock, Conn.
Harris, Henry S.	Ch.E.	1925	Allston
Hart, Blanford J.	E.E.	1926	Cromwell, Conn.
Harvey, Ralph H.	E.E.	1925	So. Berwick, Me.
Haskell, Joseph, Jr.	Ch.E.	1926	Cliftondale
Haskins, Elmer E.	M.E.	1925	Dighton
Haskins, Howard L.	M.E.	1924	Wollaston
Hatch, Douglas P.	M.E.	1923	Lynn
Hathaway, Chauncey E.	Ch.E.	1923	Dorchester
Havlicek, Joseph A.	C.E.	1925	Middletown, Conn.
Hayes, Melroy M.	C.E.	1926	Groveton, N. H.
Hazard, Robert B.	C.E.	1926	Belmont
Hazen, Clarence A.	C.E.	1926	Newton Highlands
Heady, Chauncey M.	Ch.E.	1926	Torrington, Conn.
Hearty, Herbert W., Jr.	M.E.	1925	Dorchester
Hedlund, Charles F.	E.E.	1925	Braintree
Heinlein, Martin L.	E.E.	1923	South Natick
Henley, Martin S.	C.E.	1926	Holden
Heywood, Andrew H.	E.E.	1926	Pownal, Me.
Hiatt, Frank C.	E.E.	1923	Malden
Hicks, William W.	C.E.	1926	Newburyport
Higgins, Dennis I.	E.E.	1926	Dexter, Me.
Hill, Preston W.	Ch.E.	1925	Brookline

## SCHOOL OF ENGINEERING

NAME	DEPT.	YEAR	HOME ADDRESS
Hillman, Earle M.	C.E.	1926	Bangor, Me.
Hilton, Henry B.	C.E.	1926	Danvers
Hiltz, Walter M.	E.E.	1925	Everett
Hinckley, Herbert P.	M.E.	1925	Mamarneck, N. Y.
Hjelmberg, Arthur G.	M.E.	1924	Boston
Hoar, Clinton A.	Ch.E.	1926	Rangeley, Me.
Hodgkins, Myles M.	Ch.E.	1926	Roslindale
Hoffman, Harry J.	E.E.	1924	Jamaica Plain
Holburn, John G.	C.E.	1926	Everett
Holland, Carl T.	E.E.	1923	Nantasket Beach
Holmes, Ashton B.	E.E.	1925	Charlestown, N. H.
Holmes, John E.	C.E.	1925	Wollaston
Hopkins, Forrest R.	M.E.	1923	Bristol, N. H.
Hopkins, Howe Hoyt	M.E.	1925	Trenton, Me.
Hopkins, John L.	E.E.	1926	Jamaica, B. W. I.
Houghton, Horace C.	M.E.	1926	Dorchester
Houghton, Norman R.	E.E.	1925	Stoneham
Hovenanian, Hovenan	Ch.E.	1925	Cambridge
Howard, John M.	E.E.	1924	Providence, R. I.
Hubbard, Howard M.	M.E.	1923	Springfield
Hubby, Leon F.	E.E.	1924	Lee
Hubby, Paul E.	M.E.	1926	Lee
Huggins, George L.	M.E.	1926	Everett
Hull, Randolph M.	E.E.	1926	W. Hoboken, N. J.
Hulsman, Kenneth G.	C.E.	1924	Everett
Humphreys, Everett H.	E.E.	1926	Lowell
Hunt, Percival R.	M.E.	1926	Salem
Huntington, Clarence M.	M.E.	1923	Cambridge
Jacobson, Howard V.	M.E.	1925	Concord
Jaffe, Meyer R.	C.E.	1926	No. Adams
Janes, George N.	M.E.	1925	Chelsea
Jenks, Donald G.	E.E.	1924	Attleboro
Jennings, Lawrence W.	M.E.	1924	Winthrop
Jennings, Louis A.	E.E.	1926	Broadway, Va.
Johnson, Joseph E.	M.E.	1923	Roxbury
Johnson, Theodore A.	C.E.	1925	Marlboro
Johnson, Walter A.	M.E.	1924	Dorchester
Johnston, William R.	M.E.	1926	Clinton
Jones, Archibald L.	E.E.	1924	Middleton
Jones, Harold H.	C.E.	1923	Swampscott
Jones, Henry C.	M.E.	1925	Lowell
Jordan, Harold P.	M.E.	1926	Brockton
Kalinsky, Joseph W.	C.E.	1926	Roxbury
Kalstein, Abraham	E.E.	1926	Boston
Kaplan, George	M.E.	1926	Mattapan
Kasper, Sigmund J.	E.E.	1926	Peabody
Katranis, George J.	E.E.	1925	Boston
Katzeff, Julius	Ch.E.	1925	Winthrop
Kearney, Ralph N.	M.E.	1926	Boston
Keely, James E.	E.E.	1926	Somerville
Keenan, Edward P.	C.E.	1926	Marblehead
Keene, Albert R.	M.E.	1926	Quincy
Keene, Burton F.	E.E.	1923	South Hanson
Keith, Walter S.	E.E.	1926	Whitman

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NAME	DEPT.	YEAR	HOME ADDRESS
Kelleher, James J.	M.E.	1924	<i>Salem</i>
Kelliher, Clement A.	M.E.	1926	<i>Malden</i>
Kelly, Harold W.	C.E.	1924	<i>Boston</i>
Kennedy, Augustus C.	C.E.	1925	<i>Roslindale</i>
Kennedy, Parker R.	C.E.	1925	<i>Boston</i>
Kenney, David J.	C.E.	1923	<i>Boston</i>
Kenney, Francis B.	C.E.	1924	<i>Manchester, N. H.</i>
Kenney, John H.	M.E.	1923	<i>Boston</i>
Kershner, Walter L.	E.E.	1926	<i>Strong, Me.</i>
Keville, Leo A.	C.E.	1925	<i>Lowell</i>
Kibildis, George	E.E.	1926	<i>Lawrence</i>
Kimball, Carleton B.	E.E.	1925	<i>Salisbury</i>
Kimball, Donald S.	M.E.	1925	<i>Bridgewater</i>
King, Arthur M.	C.E.	1925	<i>West Medway</i>
King, Earle	C.E.	1926	<i>Pottersville</i>
King, Hamilton W.	E.E.	1926	<i>Westfield</i>
Kingsbury, Herbert F.	E.E.	1926	<i>Framingham</i>
Kinney, Harry H.	M.E.	1926	<i>Lynn</i>
Knight, Robert H.	E.E.	1925	<i>Newbury</i>
Knopp, Otto R. H.	E.E.	1923	<i>Taunton</i>
Knuepfer, Charles F.	M.E.	1923	<i>Boston</i>
Kontio, Henry A.	E.E.	1926	<i>Rockport, Me.</i>
Kopp, Bernard J.	E.E.	1926	<i>Waterford, Conn.</i>
Kosak, Nathaniel	Ch.E.	1925	<i>Everett</i>
Koziewicz, Paul R.	E.E.	1926	<i>Boston</i>
Krohn, Bertil	E.E.	1925	<i>Hartford, Conn.</i>
Kumpel, Edgar W.	C.E.	1924	<i>Everett</i>
Kupka, Alexander	M.E.	1926	<i>Brockton</i>
Kurkdjian, Vahan B.	E.E.	1926	<i>Boston</i>
Kusmick, Michael	C.E.	1926	<i>Hartford, Conn.</i>
Lamarine, Albert E.	E.E.	1924	<i>Natick</i>
Lancaster, Elon F.	E.E.	1923	<i>Madison, Me.</i>
Landy, George	E.E.	1925	<i>Boston</i>
Lane, Charles M.	E.E.	1924	<i>Hartford, Conn.</i>
Langtry, Chester F.	C.E.	1925	<i>Framingham</i>
Lanzi, Frank L.	M.E.	1926	<i>E. Hampton, Conn.</i>
Larson, C. William	M.E.	1923	<i>Worcester</i>
Lassof, Israel	Ch.E.	1924	<i>Lexington</i>
Latimer, William H.	M.E.	1924	<i>Leominster</i>
Lauretzen, Walter M.	Ch.E.	1924	<i>Mattapan</i>
Lavers, Willard D.	C.E.	1926	<i>Salem</i>
Lavoie, Stephen D.	E.E.	1925	<i>Winthrop</i>
Law, William H.	C.E.	1924	<i>Rockport</i>
Lawler, John D.	Ch.E.	1923	<i>Lowell</i>
Lawrence, Edwin	M.E.	1926	<i>Auburndale</i>
Lawson, Henry W.	C.E.	1926	<i>Bristol, Conn.</i>
Lawton, Robert C.	M.E.	1925	<i>Orwell, Vt.</i>
Leacy, Eugene S.	M.E.	1925	<i>Watertown</i>
Leavitt, Curtis G.	C.E.	1924	<i>Taunton</i>
Leavitt, Howard L.	E.E.	1924	<i>Roxbury</i>
Leonard, Ray E.	C.E.	1926	<i>Brandon, Vt.</i>
Lessard, Theodore T.	C.E.	1925	<i>Springfield</i>
Letourneau, Roland F.	Ch.E.	1923	<i>Rockland</i>
Levin, Eli	Ch.E.	1923	<i>Roxbury</i>

## SCHOOL OF ENGINEERING

NAME	DEPT.	YEAR	HOME ADDRESS
Levine, Maurice	C.E.	1926	Fall River
Levy, Harry	Ch.E.	1926	Beverly
Lewis, Ervin H	E.E.	1923	Newtonville
Lewis, John B.	C.E.	1926	Arlington Heights
Libby, Donald R.	E.E.	1926	Yarmouthville, Me.
Lightbown, John	E.E.	1926	New Bedford
Lindgren, Oscar R.	C.E.	1926	Ansonia, Conn.
Lindskog, Sidney W.	E.E.	1924	Brockton
Linell, Elmer G.	E.E.	1925	Gardner
Littlefield, Laurence T	M.E.	1926	Newburyport
Locash, Salvatore	C.E.	1925	Wakefield
Locke, Roger P.	M.E.	1925	Salem
Lombard, Emmons S.	E.E.	1926	Windsor, Vt.
Long, Edmund T.	E.E.	1926	Boston
Longley, Raymond J.	Ch.E.	1926	Barton, Vt.
Lord, Forrest M.	E.E.	1925	Sharon
Lord, Frederic	Ch.E.	1926	Lawrence
Loubris, Gaston E.	E.E.	1923	Wakefield
Loud, Vernon F.	M.E.	1926	W. Duxbury
Luippold, John J.	M.E.	1926	W. Roxbury
Lundin, Erik H.	E.E.	1923	Proctor, Vt.
Lynam, Patrick J.	Ch.E.	1926	Medford
Lynch, John T.	E.E.	1925	Cliftondale
Lynch, Thomas J.	M.E.	1925	Dorchester
Mabey, Melvin J.	C.E.	1925	Newton
Macaulay, James E.	C.E.	1925	Medford
MacConnell, Norman J.	E.E.	1925	Medford
MacDonald, Robert	M.E.	1924	W. Roxbury
MacKay, Albert T.	E.E.	1926	P. E. I., Canada
MacKay, Chauncey D.	M.E.	1925	Dorchester
MacKenna, Leon J.	M.E.	1926	Boston
MacKinnon, Weber J.	E.E.	1925	Meriden, Conn.
MacLachlan, Robert D.	Ch.E.	1926	Roslindale
MacLeod, Edward M.	E.E.	1925	Dedham
Macomber, Charles W.	E.E.	1925	Marshfield Hills
Macomber, Paul C.	Ch.E.	1926	Marshfield Hills
MacWilliams, Arthur F.	Ch.E.	1925	Cambridge
Maddocks, Joseph W.	E.E.	1926	Saugus
Mader, Earl E.	C.E.	1923	Taunton
Mahoney, James B.	E.E.	1925	Portsmouth, N. H.
Mahoney, John H.	E.E.	1924	Salem
Mahoney, Raymond W.	Ch.E.	1926	Lynn
Maier, William F.	E.E.	1925	Dorchester
Mailhot, Wilbrod A.	E.E.	1925	Sanford, Me.
Maitland, Fred R.	E.E.	1926	Cohasset
Malinsky, Hyman	M.E.	1926	Brockton
Malloch, Ernest M.	C.E.	1925	Eastport, Me.
Malloy, John W.	M.E.	1924	Roxbury
Malm, Herbert A.	M.E.	1924	Worcester
Malnate, William F.	C.E.	1924	Quincy
Marcoux, Ernest A	Ch.E.	1926	No. Hanover
Margeson, Vertrude C.	E.E.	1926	Everett
Marsh, Edwin E. R.	E.E.	1925	Pittsfield
Marshall, Elmer P.	Ch.E.	1924	Allston

## REGISTER OF STUDENTS

NAME	DEPT.	YEAR	HOME ADDRESS
Marshall, James P.	E.E.	1923	Hallowell, Me.
Marshall, Ralph D.	C.E.	1926	Townsend
Martin, Arthur D.	C.E.	1925	Richford, Vt.
Martinelli, Henry C.	M.E.	1924	Springfield
Martinson, Edwin A.	Ch.E.	1926	Concord
Mathers, Ernest	C.E.	1926	Milton
Matthews, Adrian M.	M.E.	1926	Bristol, Conn.
Maurette, Rene G.	E.E.	1925	Medford
Maxwell, George W.	E.E.	1925	Melrose
Maxwell, Sherman O.	M.E.	1925	Boston
Meade, William H., Jr.	E.E.	1923	Peabody
Mekkelsen, Maurice	Ch.E.	1926	West Somerville
Melcher, George H.	C.E.	1926	Salem
Mellor, Frederick	C.E.	1926	New Bedford
Merrill, Fred R.	M.E.	1926	Hudson, N. H.
Merrill, Louis F.	M.E.	1925	Wollaston
Meserve, George H.	C.E.	1925	Medford
Messer, Merton W.	M.E.	1926	Concord, N. H.
Messier, Joseph A.	E.E.	1924	Quincy
Mihaljan, Manuel J.	Ch.E.	1926	Cambridge
Millen, Alan R.	C.E.	1926	Quincy
Mills, John W.	E.E.	1926	Boston
Milne, David C.	C.E.	1923	Dorchester
Mitchell, Charles B.	C.E.	1925	Lawrence
Mizzi, Dousiano C.	E.E.	1926	Salem
Moauro, Joseph S.	E.E.	1926	Springfield
Montana, Edward J.	M.E.	1926	Roslindale
Moody, Donald C.	M.E.	1923	Bradford
Moore, Charles K.	C.E.	1924	Fall River
Moran, Thomas S.	M.E.	1926	Fall River
Morgan, Frederick N.	C.E.	1925	Everett
Morgan, Harold E.	C.E.	1926	Lawrence
Morley, Frank W.	E.E.	1926	Hyde Park
Morrell, Stanley A.	E.E.	1923	Peabody
Morris, Joseph A.	E.E.	1924	New Britain, Conn.
Morse, Clifford H.	C.E.	1926	Melrose
Morse, Howard W.	E.E.	1925	Lynn
Mosher, Richard H.	C.E.	1926	Watertown
Moulton, Earl L.	M.E.	1926	Weymouth
Moulton, Maurice E.	E.E.	1926	Portland, Me.
Mower, C. Thomas	Ch.E.	1924	Malden
Muir, George, Jr.	C.E.	1926	Roslindale
Murphy, Charles L.	C.E.	1924	Worcester
Murphy, Nelson L.	C.E.	1925	Waltham
Murphy, Walter J.	Ch.E.	1926	East Walpole
Myers, Ernest A.	E.E.	1926	Hyde Park
McCool, James H.	E.E.	1925	South Boston
McCray, George F.	C.E.	1925	Rochester, Vt.
McElhinney, Earle S.	M.E.	1924	Lynn
McElwee, Ira C.	E.E.	1926	Lubec, Me.
McGee, Harold B.	Ch.E.	1926	Boston
McGuerty, Charles V.	M.E.	1925	Woburn
McKay, Donald S.	E.E.	1926	Kissimmee, Fla.

## SCHOOL OF ENGINEERING

NAME	DEPT.	YEAR	HOME ADDRESS
McKenna, George A.	C.E.	1926	<i>Waltham</i>
McKenne, Charles D.	M.E.	1923	<i>Everett</i>
McKewen, Daniel	Ch.E.	1924	<i>Mattapan</i>
McLaughlin, John F.	E.E.	1926	<i>Beverly Farms</i>
McManamin, Edward F.	C.E.	1926	<i>Wakefield</i>
McManus, John P.	C.E.	1923	<i>Roxbury</i>
Navisky, Moses	Ch.E.	1925	<i>Boston</i>
Neil, Dexter S.	C.E.	1926	<i>Lowell</i>
Nelson, Carl H.	C.E.	1925	<i>Dorchester</i>
Nelson, Carl W.	E.E.	1926	<i>Brockton</i>
Nelson, Edwin W.	M.E.	1926	<i>Hartford, Conn.</i>
Newell, David M.	E.E.	1926	<i>Amesbury</i>
Newsome, George W.	E.E.	1926	<i>Stratford, Conn.</i>
Newton, Elmer C.	E.E.	1925	<i>Raymond, N. H.</i>
Nickerson, Edgar W.	C.E.	1925	<i>Beverly</i>
Nicol, James	E.E.	1926	<i>Fall River</i>
Nicoletta, Joseph	M.E.	1926	<i>Lynn</i>
Niehcay, Frank	C.E.	1925	<i>Boston</i>
Nieske, George F.	C.E.	1926	<i>Monson</i>
Noble, Robert A.	E.E.	1923	<i>Rochester, Vt.</i>
Nolf, Ralph L.	E.E.	1925	<i>Webster</i>
Norris, Fenton H.	Ch.E.	1926	<i>Cambridge</i>
Noyes, Roswell L.	M.E.	1925	<i>Newburyport</i>
Oakman, Roger G.	C.E.	1924	<i>Neponset</i>
Oberg, Rudolph O. M.	E.E.	1926	<i>Neponset</i>
O'Brien, Frank D.	C.E.	1926	<i>Fall River</i>
Odiorne, Kenneth W.	M.E.	1926	<i>Malden</i>
Ogden, Milton P.	E.E.	1925	<i>Fall River</i>
O'Leary, Leo T.	C.E.	1925	<i>Dorchester</i>
Oliva, John F.	E.E.	1924	<i>E. Weymouth</i>
Otis, Dwight C.	Ch.E.	1926	<i>Melrose Highlands</i>
Overbeck, Royal C.	Ch.E.	1924	<i>Gloucester</i>
Pagliarulo, Joseph F.	C.E.	1926	<i>Boston</i>
Paige, Herman A.	M.E.	1925	<i>Dorchester</i>
Paige, Timothy J.	E.E.	1926	<i>New Salem</i>
Palmer, Reginald W.	C.E.	1925	<i>Norfolk Downs</i>
Papoulias, Louis T.	M.E.	1926	<i>Newburyport</i>
Parker, Burton C.	C.E.	1925	<i>Holden</i>
Parker, David L.	Ch.E.	1926	<i>Lynn</i>
Parker, Horace R., Jr.	E.E.	1925	<i>Swampscott</i>
Parker, John C.	C.E.	1926	<i>Newburyport</i>
Parsons, Lester J.	Ch.E.	1926	<i>Roxbury</i>
Parsons, William N.	C.E.	1924	<i>Gloucester</i>
Partiss, Richard G.	C.E.	1926	<i>Hartford, Conn.</i>
Pasanen, Walter R.	M.E.	1926	<i>Worcester</i>
Paulsen, Iver E.	Ch.E.	1923	<i>Woburn</i>
Payette, Albert A.	C.E.	1926	<i>Everett</i>
Pearlman, Saul	M.E.	1926	<i>Dorchester</i>
Peck, Donald L.	E.E.	1923	<i>Framingham</i>
Penniman, Frederic G.	C.E.	1925	<i>Whitman</i>
Penniman, John R.	C.E.	1924	<i>Whitman</i>
Percival, Vernon E.	M.E.	1926	<i>Cambridge</i>
Perkins, Eustace J.	E.E.	1925	<i>Wenham</i>
Perkins, James B.	M.E.	1926	<i>W. Stoughton</i>

## REGISTER OF STUDENTS

NAME	DEPT.	YEAR	HOME ADDRESS
Perley, George T.	E.E.	1924	Wollaston
Perrone, Frank	C.E.	1926	Winthrop
Perry, Alfred L.	M.E.	1924	Everett
Perry, Edward J.	M.E.	1923	Putnam, Conn.
Perry, Lyndall R.	Ch.E.	1925	Medford
Pestridge, Francis H.	C.E.	1926	Springfield
Peterson, Clarence W.	M.E.	1923	Everett
Peterson, Enar E. F.	E.E.	1926	Brockton
Peterson, Halvar A.	E.E.	1925	Waltham
Pfeferholtz, Benjamin	E.E.	1926	Lawrence
Phillips, Earle G.	E.E.	1926	Wenham
Phinney, Edward D.	E.E.	1924	Topsham, Me.
Pickering, Gordon A.	M.E.	1926	Leominster
Pierce, John F.	C.E.	1923	South Weymouth
Pierce, Melvin G.	E.E.	1925	Arlington
Pierce, William M.	Ch.E.	1926	Melrose
Piercy, Elmer F.	E.E.	1926	Braintree
Pillsbury, Arthur M.	C.E.	1926	Scarboro, Me.
Pinkul, Edward J.	C.E.	1924	Dorchester
Pion, Noel A.	E.E.	1926	Brockton
Piper, Ernest W.	E.E.	1925	Quincy
Pitman, George M.	C.E.	1925	Salem
Platter, Charles T.	C.E.	1926	Boston
Plaus, Harley O.	M.E.	1925	Cummington
Plunkett, Robert K.	M.E.	1924	Dorchester
Poley, Abraham	C.E.	1925	Boston
Powers, Fern L. B.	E.E.	1925	Boston
Prophet, Alta E.	C.E.	1925	Clinton
Quilty, Ralph G.	Ch.E.	1924	Dorchester
Quimby, Willis D.	Ch.E.	1926	Lynn
Quinn, John F.	E.E.	1923	Salem
Rabinowitz, Louis	E.E.	1924	Roxbury
Rafferty, Thomas E.	C.E.	1926	Boston
Randall, Clifford P.	Ch.E.	1926	Wollaston
Ravden, Sydney	Ch.E.	1925	Dorchester
Ravreby, Abraham A.	Ch.E.	1925	Boston
Rawding, Charles F.	E.E.	1926	East Lynn
Rawley, Robert T.	C.E.	1926	Putnam, Conn.
Raymond, Kenneth C.	C.E.	1926	Waltham
Read, Herbert C.	Ch.E.	1925	Springfield
Recor, John O.	E.E.	1926	Stowe, Vt.
Redlon, Gilbert F.	E.E.	1926	Quincy
Reed, Kenneth D.	M.E.	1925	Winthrop
Reed, Linwood L.	M.E.	1923	Everett
Reed, Robert F.	E.E.	1923	Granville Ferry, N. S.
Reuther, Willard E.	E.E.	1925	Jefferson
Reynolds, John H.	M.E.	1925	Everett
Riccio, Angelo P.	M.E.	1925	Watertown
Rich, L. Ashley	Ch.E.	1923	Newton
Richard, Irene T.	M.E.	1924	Salem
Richards, Charles N. A.	C.E.	1925	Milton
Richman, Hyman P.	E.E.	1926	Quincy
Rideout, Edward H.	Ch.E.	1925	Somerville
Riley, Edward F.	M.E.	1926	Wareham

## SCHOOL OF ENGINEERING

NAME	DEPT.	YEAR	HOME ADDRESS
Ripley, Franklin L.	Ch.E.	1926	<i>W. Stewartstown, N.H.</i>
Robbins, Malcolm C.	E.E.	1926	<i>Taunton</i>
Roberts, George I.	E.E.	1924	<i>E. Weymouth</i>
Roberts, Ulysses K.	E.E.	1925	<i>Brockton</i>
Robinson, Mark M.	M.E.	1926	<i>Fitchburg</i>
Roby, Wilbur H.	E.E.	1925	<i>Arlington</i>
Rocchi, Frank	C.E.	1925	<i>W. Everett</i>
Rommer, George J.	M.E.	1925	<i>Dorchester</i>
Rood, Clarence B.	C.E.	1925	<i>West Medford</i>
Root, Burritt A.	M.E.	1923	<i>New Britain, Conn.</i>
Rose, Arthur	Ch.E.	1926	<i>Chelsea</i>
Ross, Edison H.	E.E.	1926	<i>Norton</i>
Rothwell, William P.	Ch.E.	1926	<i>Boston</i>
Rubin, Benjamin	C.E.	1923	<i>Roxbury</i>
Rubin, Morris	C.E.	1925	<i>Roxbury</i>
Rundlett, John C.	C.E.	1924	<i>Newburyport</i>
Russ, Glen W.	Ch.E.	1926	<i>Groveton, N. H.</i>
Russell, Charles C., Jr.	E.E.	1923	<i>Exeter, N. H.</i>
Russell, George H.	C.E.	1926	<i>Springfield</i>
Russell, John B.	C.E.	1924	<i>Quincy</i>
Russell, Roland P.	E.E.	1926	<i>Skowhegan, Me.</i>
Rylander, Everett A.	E.E.	1926	<i>Marlboro</i>
Saliba, George J.	E.E.	1926	<i>Lawrence</i>
Sampson, James	M.E.	1926	<i>Roxbury</i>
Sanborn, Frank D.	M.E.	1924	<i>Springfield, Vt.</i>
Sanborn, George H.	M.E.	1924	<i>Springfield, Vt.</i>
Sanders, Dudley M.	E.E.	1926	<i>Newburyport</i>
Sanderson, Albert E.	C.E.	1925	<i>Waltham</i>
Sanderson, Page	C.E.	1926	<i>Wellesley</i>
Savery, Arlo R.	C.E.	1926	<i>Silver Lake</i>
Savignac, Alphonse	C.E.	1923	<i>Amesbury</i>
Savikoski, George V.	Ch.E.	1926	<i>Maynard</i>
Sawin, George W.	C.E.	1926	<i>Allston</i>
Sawtell, Raymond I.	E.E.	1924	<i>Shrewsbury</i>
Sayward, Paul H.	M.E.	1925	<i>Allston</i>
Schaller, Irving R.	E.E.	1924	<i>Salem</i>
Schiano, Harold S.	C.E.	1926	<i>Roslindale</i>
Schneider, Arthur E.	Ch.E.	1925	<i>Meriden, Conn.</i>
Schramm, George F.	C.E.	1926	<i>Boston</i>
Schwartz, Joseph P.	C.E.	1924	<i>Revere</i>
Schwartz, Max	C.E.	1925	<i>Chelsea</i>
Seaman, Walter R.	M.E.	1925	<i>Roxbury</i>
Secord, Harold W. M.	E.E.	1923	<i>Newton</i>
Shailer, Fisk A.	M.E.	1924	<i>Chester, Conn.</i>
Shapiro, David	C.E.	1925	<i>Fall River</i>
Sharples, Oswald	E.E.	1925	<i>Waltham</i>
Shaw, Richard C.	M.E.	1923	<i>E. Bridgewater</i>
Shea, Albert L.	M.E.	1925	<i>Rumford, Me.</i>
Shea, Paul C.	Ch.E.	1926	<i>Lynn</i>
Shenk, Norman A.	C.E.	1925	<i>Medford</i>
Shepard Chester D.	C.E.	1925	<i>Everett</i>
Sheridan, George H.	M.E.	1925	<i>Needham</i>
Sherman, Daniel H.	Ch.E.	1926	<i>Roxbury</i>
Sherman, Wilson R.	E.E.	1926	<i>Fall River</i>

## REGISTER OF STUDENTS

NAME	DEPT.	YEAR	HOME ADDRESS
Shields, Wilfred H.	C.E.	1925	<i>Dorchester</i>
Short, B. James	E.E.	1925	<i>Boston</i>
Short, Randolph	E.E.	1925	<i>Newburyport</i>
Shuman, Franklin C.	M.E.	1926	<i>Somerville</i>
Shumavonian, Sorun P.	C.E.	1924	<i>Dorchester</i>
Shumway, Herbert L.	M.E.	1923	<i>Mattapan</i>
Sibley, Clifton A.	M.E.	1925	<i>Salem</i>
Sidney, Russell B.	E.E.	1926	<i>Medford</i>
Silverman, Morris	M.E.	1924	<i>Quincy</i>
Skelton, Bradford S.	E.E.	1926	<i>Burlington</i>
Skinner, Charles E.	C.E.	1926	<i>Roslindale</i>
Slobin, Harold M.	C.E.	1925	<i>Worcester</i>
Smalley, Dayton B., Jr.	E.E.	1926	<i>Johnson, Vt.</i>
Smart, Raymond L.	M.E.	1926	<i>Salem</i>
Smethurst, Raymond	C.E.	1925	<i>Hopedale</i>
Smiley, Kenneth S.	Ch.E.	1925	<i>Skowhegan, Me.</i>
Smith, Alexander F.	C.E.	1926	<i>Hyde Park</i>
Smith, Benjamin L.	E.E.	1923	<i>Concord</i>
Smith, Clarence W.	E.E.	1926	<i>Newton</i>
Smith, Dana B.	Ch.E.	1926	<i>Fall River</i>
Smith, Farnham W.	M.E.	1924	<i>Concord</i>
Smith, Robert B.	M.E.	1924	<i>Leominster</i>
Smith, William P.	M.E.	1926	<i>Lawrence</i>
Solomon, John B.	E.E.	1926	<i>Melrose Highlands</i>
Somes, John J.	M.E.	1924	<i>Boston</i>
Souther, George H.	M.E.	1924	<i>Winthrop</i>
Souther, Shirley M.	E.E.	1926	<i>Hingham</i>
Sozio, Albert	C.E.	1926	<i>East Boston</i>
Spaulding, Harold L.	E.E.	1925	<i>Sharon</i>
Spaulding, Howard P.	E.E.	1926	<i>Stoughton</i>
Spiegel, Maurice	Ch.E.	1925	<i>Malden</i>
Spousta, Hermann	C.E.	1926	<i>Raynham</i>
Squier, Roger W.	C.E.	1925	<i>Boston</i>
Staffhorst, Harry D.	M.E.	1926	<i>Lynn</i>
Stanetsky, Lewis	C.E.	1926	<i>Everett</i>
Stanton, Fred P., Jr.	E.E.	1924	<i>Wenham</i>
Start, W. Parker	C.E.	1926	<i>Bakersfield, Vt.</i>
Stearns, Elton O.	C.E.	1924	<i>Waltham</i>
Stephenson, William G.	C.E.	1925	<i>Needham</i>
Stern, Frederick P.	C.E.	1925	<i>Somerville</i>
Stetson, Robert H.	E.E.	1926	<i>Danvers</i>
Stevens, Charles N.	E.E.	1925	<i>Marlboro</i>
Stevens, Philip L.	Ch.E.	1926	<i>E. Wakefield, N. H.</i>
Stevens, Thomas A.	E.E.	1923	<i>Deep River, Conn.</i>
Stewart, Harold N.	C.E.	1926	<i>Rumford, Me.</i>
Stewart, James C.	Ch.E.	1925	<i>Brookline</i>
Stimpson, Charles H., Jr.	C.E.	1926	<i>Weston</i>
Stockwell, Laurence F.	E.E.	1926	<i>W. Millbury</i>
Stockwell, Philip J.	E.E.	1926	<i>W. Medford</i>
Stodder, Williston F.	C.E.	1926	<i>Somerville</i>
Stone, Robert G.	E.E.	1926	<i>Ashby</i>
Stonequist, Edward H.	M.E.	1924	<i>Worcester</i>
Stotz, Herman C.	C.E.	1924	<i>Brighton</i>
Studler, Morris	C.E.	1925	<i>Beachmont</i>

## SCHOOL OF ENGINEERING

NAME	DEPT.	YEAR	HOME ADDRESS
Sullivan, Robert J.	E.E.	1926	Roslindale
Sullivan, William H.	M.E.	1923	Canton
Surabian, Peter H.	E.E.	1923	West Boylston
Swain, Harold H.	E.E.	1925	Melrose
Swanson, Gustaf	Ch.E.	1923	Proctor, Vt.
Swanson, Wallace C.	M.E.	1924	Lynn
Sweetland, William F.	E.E.	1924	Providence, R. I.
Swift, Ralph E.	M.E.	1925	Longmeadow
Tarplin, Emanuel	Ch.E.	1923	Lynn
Tasker, Malcolm D.	E.E.	1926	Winthrop
Tasse, George R.	M.E.	1926	Worcester
Taylor, Clarence W.	Ch.E.	1926	Allston
Taylor, Faye B.	M.E.	1926	Brunswick, Me.
Taylor, Leslie I.	M.E.	1925	Hartford, Conn.
Taylor, Randolph F.	E.E.	1926	Moultonboro, N. H.
Taylor, Robert N.	Ch.E.	1924	West Newton
Tether, Clayton L.	C.E.	1926	Holyoke
Thackaberry, George N.	E.E.	1926	Boston
Theriault, Joseph E.	C.E.	1925	Newton
Thompson, Alan M.	C.E.	1923	Roslindale
Thompson, George B.	E.E.	1925	Willimantic, Conn.
Thompson, George M.	M.E.	1925	Norwood
Thompson, Gordon M.	Ch.E.	1926	West Roxbury
Thompson, Harold C.	C.E.	1923	Bridgewater
Thompson, Herbert L.	Ch.E.	1923	Norwood
Thomson, Claude W. R.	M.E.	1924	Holyoke
Thomson, Earl H.	M.E.	1925	Boston
Thorburn, George H., Jr.	Ch.E.	1926	Marblehead
Thwing, Stanley G.	E.E.	1925	Cambridge
Tileston, Clarence C.	Ch.E.	1926	West Roxbury
Todaro, Carl A.	M.E.	1926	Boston
Todd, Floyd E.	E.E.	1925	Cape Neddeck, Me.
Tomkinson, Albert E.	E.E.	1926	White River Jct., Vt.
Toole, Cameron S.	C.E.	1923	Clinton
Toole, Harold J.	C.E.	1925	Clinton
Topalian, Asadour	E.E.	1923	Brighton
Torrey, Joseph H.	M.E.	1925	Bath, Me.
Traiton, Mark	E.E.	1926	South Hanover
Troccoli, Frank A.	E.E.	1926	Malden
Tucker, Nathan	C.E.	1925	Roxbury
Tucker, Newton E.	Ch.E.	1925	New Britain, Conn.
Tulloch, Douglas F.	E.E.	1924	Bridgewater
Turner, Elmer A.	E.E.	1926	Marlboro
Tyrrell, Harold F.	C.E.	1926	Claremont, N. H.
Ulmer, Donald J.	E.E.	1924	Attleboro
Urquhart, James W.	C.E.	1926	Waltham
Varney, Charles A.	C.E.	1926	Freeport, Me.
Venner, Alexander H.	E.E.	1926	Lawrence
Vertic, John J.	C.E.	1926	Lawrence
Vigdor, Irving A.	E.E.	1925	Dorchester
Vincent, George D.	C.E.	1923	Watertown
Vines, Frederick D. L.	E.E.	1924	Greenbush
Visnick, Alexander	M.E.	1926	Mattapan
Wade, Edward A.	E.E.	1924	Boston

## REGISTER OF STUDENTS

NAME	DEPT.	YEAR	HOME ADDRESS
Wagner, Herbert E.	E.E.	1926	Lowell
Waldron, F. Elliott	E.E.	1924	Gloucester
Walker, Lawrence D.	Ch.E.	1924	Watertown
Wall, Roy H.	Ch.E.	1926	Worcester
Wallis, Carl R.	E.E.	1926	Needham Heights
Walsh, Clinton H.	E.E.	1926	Fall River
Ward, Cecil A.	C.E.	1926	Wakefield
Warner, David G.	M.E.	1924	Sterling
Warren, Roger M.	E.E.	1926	Belchertown
Waterman, Fred E.	C.E.	1926	Norwich, Vt.
Watson, Francis	M.E.	1925	Jamaica Plain
Webber, Alfred H.	E.E.	1926	Bedford
Webber, Ralph F.	M.E.	1926	Wrentham
Weinstein, Joseph	C.E.	1926	Portland, Me.
Welch, John Eli	E.E.	1926	Springfield
Wellman, John R.	E.E.	1925	Melrose
Weschrob, Charles W.	M.E.	1925	East Dedham
Weston, Philip O.	E.E.	1924	Mattapan
Wetmore, George H.	E.E.	1924	Peabody
Wheaton, Myron E.	E.E.	1926	Washington Depot, Ct.
Wheeler, Harold	Ch.E.	1925	Winthrop
Wheeler, Holland S.	E.E.	1926	Keene, N. H.
Whenman, Jack H.	M.E.	1926	Leominster
White, Enoch J.	E.E.	1926	Dyer Brook, Me.
White, William C.	E.E.	1925	Dorchester
Whitehead, Arthur F.	M.E.	1925	Quincy
Whiting, Raymond C.	M.E.	1926	Upton
Whiton, Wilson	M.E.	1923	Hingham
Whittaker, Albert E.	M.E.	1924	Lynn
Wickerson, Clarence R.	C.E.	1925	Mattapan
Wiklund, Walfred G.	C.E.	1926	Allston
Wilcox, Arthur L.	C.E.	1924	Maynard
Wiley, Charles H.	E.E.	1926	Hartford
Wilgren, Niilo J.	E.E.	1926	Stow
Willey, Clyde C.	C.E.	1926	Manchester, N. H.
Willey, Lawrence V.	C.E.	1924	Skowhegan, Me.
Williams, Clifton S.	E.E.	1925	Hartford, Conn.
Wilson, Clarence D.	Ch.E.	1926	Malden
Wilson, David C.	M.E.	1925	South Norwalk, Conn.
Wilson, Herbert A.	C.E.	1926	West Roxbury
Wilson, Kenneth I.	E.E.	1926	Somerville
Wilson, Norman T.	E.E.	1926	Newburyport
Winslow, F. Gordon	M.E.	1925	South Hanover
Winslow, Lawrence A.	E.E.	1926	Watertown
Wise, Frank G.	M.E.	1926	Newburyport
Witherell, Roger	C.E.	1925	Taunton
Wolfum, Carl A.	C.E.	1926	Boston
Wonson, Paul A.	C.E.	1926	Gloucester
Wood, Milton J.	E.E.	1926	Belchertown
Works, Herbert F.	E.E.	1925	Marlboro
Worth, Arnold M.	E.E.	1926	Springfield
Wright, Maurice H.	Ch.E.	1924	Springfield
Wyner, Henry I.	C.E.	1925	Allerton
Young, Claude	M.E.	1924	Quincy

## SCHOOL OF ENGINEERING

NAME	DEPT.	YEAR	HOME ADDRESS
Young, George F., Jr.	E.E.	1925	<i>Somerville</i>
Young, Kenneth C.	E.E.	1925	<i>Portsmouth, N. H.</i>
Young, Paul E.	E.E.	1926	<i>Greenwood</i>
Young, Walter H.	E.E.	1924	<i>Matinicus, Me.</i>
Young, Wilfred A.	E.E.	1923	<i>Baltic, Conn.</i>
Zak, Alexander M.	C.E.	1925	<i>Boston</i>
Ziegler, George L.	M.E.	1925	<i>Concord Junction</i>
Ziegler, Theodore W.	M.E.	1925	<i>Lynn</i>
Ziegra, Albert G.	Ch.E.	1924	<i>Deep River, Conn.</i>

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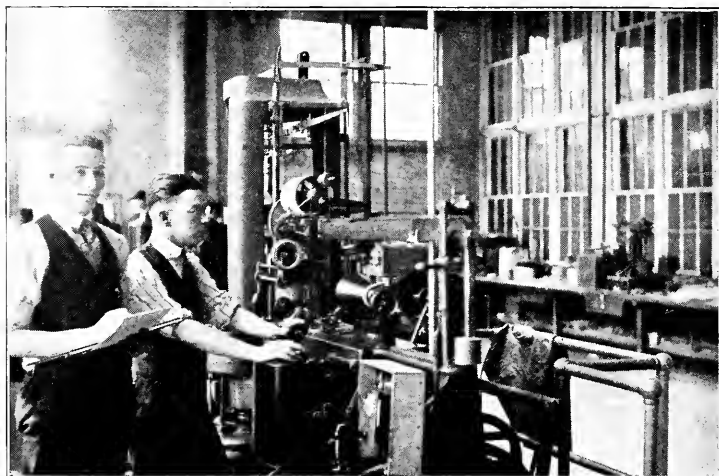
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# Electrical Engineering Students

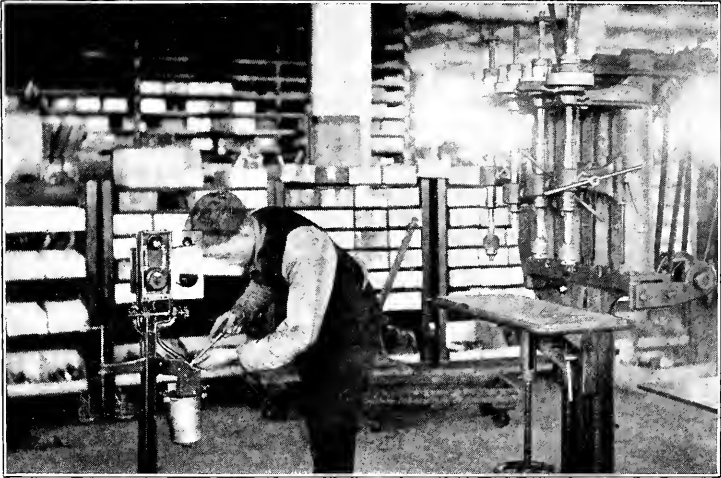


Testing Materials  
General Electric Company, Lynn

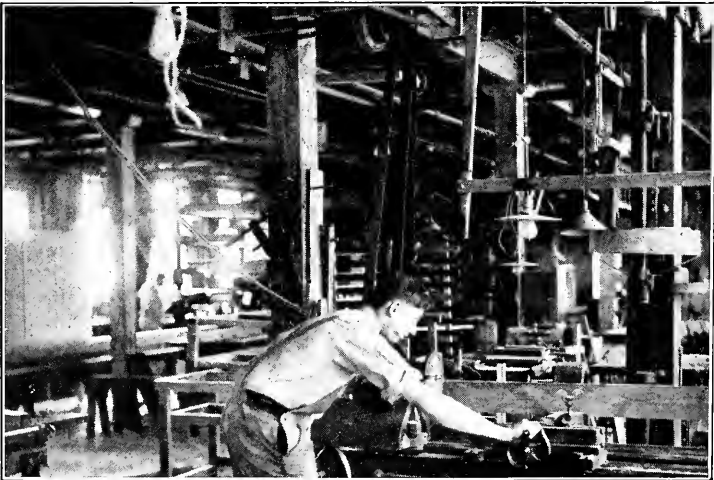


Calibrating Instruments  
Edison Electric Illuminating Co.

# Mechanical Engineering Students



Assembling Machines  
United Shoe Machinery Corporation, Beverly



Wood Turning  
Dennison Mfg. Co., Framingham

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